

NEW ZEALAND'S PERSONAL COMPUTER MAGAZINE

# BITS & BYTES

November 1985: \$2.00

## Reviews

Nimbus: UK crafted... and the Best of British?

IBM JX Unveiled

Amstrad: Why 128K?

## London Report

The Personal Computer World Show

New X'perience:

Driving the *X'press*



Starting this issue

## Bits & Bytes Christmas Competition

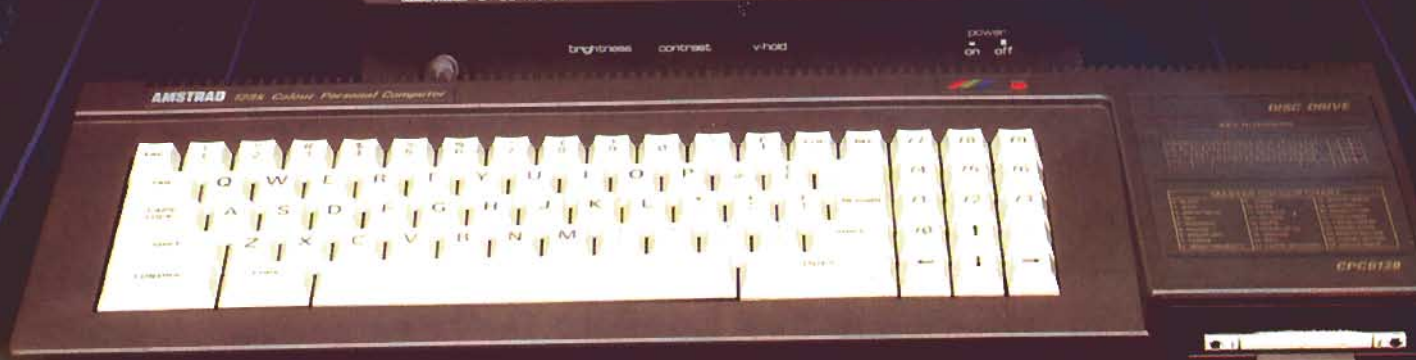
Win a Star printer, Commodore 64 & disk drive... and more!

**NEW**

**When you've  
already made the  
best home computer,  
what do you  
do for an encore?**



**\$1995**  
with Colour Monitor  
**\$1595**  
with Green Screen



**Amstrad CPC 6128**  
with Colour Monitor or Green Screen

## The Businesslike CPC6128

By including a disc drive and 128K or RAM with the CPC6128, Amstrad has elevated the budget price computer beyond being primarily a games console into the realm where serious business applications may be tackled with ease.

Digital Research's famous CP/M Plus operating system keeps your CPC6128 disc filing in order while programs like Microscript and Amsoft Business Control system (dual disc systems) keeps your business affairs in order.

The Amstrad CPC6128 is the ideal computer for the small business, and what with rates, mortgages, HP, income tax, insurance etc just about everyone can benefit from running their personal affairs with the aid of a low cost computer.

Give all your correspondence the professional touch. Plan your domestic budget, file names and addresses, organise your time more effectively. Amsoft has programmes already available to do all these tasks and many more.

## The Entertaining CPC6128

With over 300 colourful games already available covering everything from advanced flight and combat simulation to slick examples of all the arcade classics, the CPC6128 has an unfair advantage over its competitors.

There's shoot-outs, adventures, brain teasers, card games, 'simulations' — enough to keep the most agile and inquisitive minds busy indefinitely. As part of the CPC6128 package you will also receive CPM plus, GSX and Dr Logo, the world famous teaching and graphics language that introduces the concepts and ideas behind writing computer programs.

## High Performance-Low Cost

The one thing you won't need a computer to work out is that the Amstrad CPC6128 represents outstanding value for money. You only have to check the cost of buying all the elements separately, 128K RAM computer, disc drive and monitor to realise that the Amstrad package is very hard to beat.



Wordprocessing and Amword can improve the productivity of everyone from unskilled typist to trained secretary.



# YES

I'd like to know more about the totally professional CPC6128 Complete Computer System

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

POST TO: Grandstand Computers Ltd, CPO Box 2353, Auckland  
21 Great South Road, Newmarket, Auckland. Phone: 504-033

## An Expanding System

There is a complete range of peripherals available to CPC6128 which plug into built in interfaces. These include a joystick and printers. The Centronics compatible parallel printer interface connects to a vast range of printers, from low cost dot matrix through to daisywheel printers giving superb print quality.

The expansion connector at the rear of the CPC6128 contains all the signals necessary to implement a wide range of add-on peripherals. Modems, light pens, speech synthesizers and serial interfaces are amongst products already available or in development by either Amstrad or independent vendors.

## Compatibility

The Amstrad Serial Interface (RS232C) is much more than just a complete means of connecting serial printers and modems. It's a complete extension and expansion system that incorporates its own ROM software to emulate terminals so that your CPC system can work in conjunction with mini and microframe computer systems.

There's a full PRESTEL mode with graphics and colour.

The built in ROM BASIC for the CPC6128 is in the tradition of excellence established by the CPC464 and CPC664. Programs written using the CPC464/CPC664 BASIC will run on the CPC6128.

## Amstrad Join The Club

As a member you will enjoy regular magazines, competitions for valuable prizes and contact with other Amstrad users.

Whether you're a games fanatic or interested in serious business applications, you'll want to join the club.

Figure analysis made easy with Microspread.



# GRANDSTAND AMSTRAD

# Growing with your needs

Buy this NEW Personal Computer  
with more confidence, because...

## Only the NEW NCR model PC4i Provides~

Unique 12-month Guarantee\*  
Proven, 'self-teach' free tutorial  
programme\* 'Help' aid on all  
functions Full operational  
compatibility with industry-standard  
software\* New Easy-use keyboard  
Powerful, expandable RAM with  
virtual memory One-piece  
VDU/disc drives High  
resolution screen (even on  
monochrome graphics)\*  
Manufactured with 100  
years' tradition for quality.

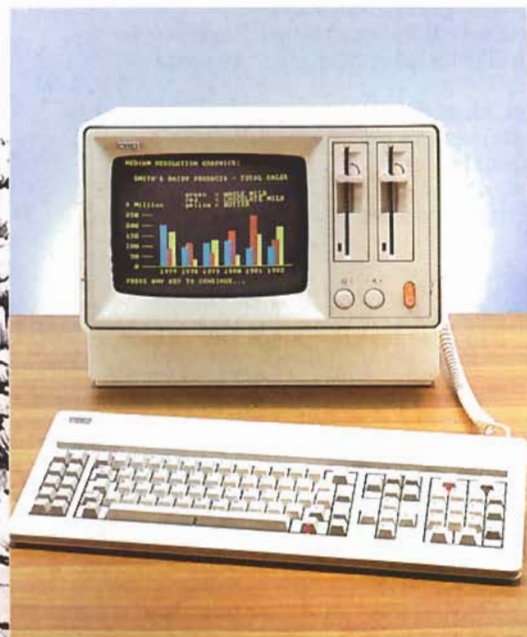
**BACKED BY A NATION-  
WIDE, LONG-ESTABLISHED  
SERVICE NETWORK\*, UNIQUE TO NCR**

\*Features which answer user priorities, as surveyed  
by Hoby & Assoc. 1984.

Call NCR  
NOW for the  
Dealer in your  
area.

You can always grow with

# NCR





# BITS & BYTES

November 1985. Vol 4, No.3

## NEWS

**Personal Computer World Show:** You're there with roving reporter Paul Crooks. **7**  
**Price War** opening shots from Commodore.

## HARDWARE

**Spectravideo's X'press** almost meets Mark James' home-business idealism. **13**  
**Nimbus** arrives and Peter Parsonage flies into it. **17**  
**Opus** drives discs for the Spectrum. **25**  
**IBM's JX** has Richard Gorham looking beyond name plates. **40**  
**Amstrad's 6128** could be an 8-bit finale, says Peter Biggs. **41**

## SOFTWARE

**An adventure game** for Colin Marshall's computer classes. **34**

## THE QUIZ

**Qn:** Would you like to win a C64, disc drive and Star printer? **38**

## FEATURES

**Toolbox**, by Gordon Findlay. **27**  
**Assembly Language**, by Neil Williamson. **29**  
**Machine Language**, by Joe Colquitt. **31**  
**Survey of Bits and Bytes readers. All 96,000 of us.** **36**

## COLUMNS

**Letters** 21  
**Amstrad** 46  
**Apple** 47  
**BBC** 48  
**Sega** 50  
**Sanyo** 52  
**Spectravideo** 53  
**Commodore** 57  
**Spectrum** 66  
**Atari** 69  
**Book reviews** 70  
**Book club** 71  
**Advertisers index** 76



Amstrad 6128



**BITS AND BYTES** magazine is published monthly (excepting January) by Bits and Bytes Ltd, Denby House, third floor, 156 Parnell Road, PO Box 9870, Auckland 1. Phone 796-776, 796-775. **EDITORIAL:** managing editor, Gaie Ellis; editor, Steven Searle; Wellington reporter, Pat Churchill, 5 Lucknow Tce, 797-193; Christchurch reporter, Dion Crooks, 66-566. **ADVERTISING:** Auckland - Paul Harris, PO Box 9870, 796-776; Wellington - Marc Heymann, PO Box 27-205, 844-985; Christchurch - Jocelyn Howard, PO Box 827, 66-566. **SUBSCRIPTIONS:** First floor, Oxford Court, 222 Oxford Tce, Christchurch, PO Box 827, Phone 66-566. Manager, Mavis Shirlcliffe. **SUBSCRIPTION RATE:** \$16 for 11 issues, school pupils rate \$14. Overseas subs are \$27/year surface mail, and airmail rates of \$59 (Australia, South Pacific), \$86 (North America and Asia), and \$108 (Europe, South America, Middle East). **BOOK CLUB:** manager, Dion Crooks, at above Christchurch address, 66-566. **DISTRIBUTION INQUIRIES:** bookshops to Gordon and Gotch Ltd, computer stores to publisher. **PRODUCTION:** graphic designer, Shona Wills; typesetter, Monoset; printer, Rodney and Waitemata Times. **DISCLAIMERS:** The published views of contributors are not necessarily shared by the publisher. Although all material in Bits and Bytes is checked for accuracy, no liability is assumed by the publisher for any losses due to use of material in this magazine. **COPYRIGHT:** All articles and programmes published herein are copyright and are not to be sold or distributed in any format to non-subscribers of Bits and Bytes.

# Now... the IBM computer for the business that thought it could never afford one.



The IBM JX is the newest and most affordable IBM computer incorporating some of the latest technology ever built into personal computers.

## Advanced technology that pays

The IBM JX did not achieve low cost by reducing function. It achieves its outstanding price/performance through some of the most advanced component and production technology ever offered on any personal computer at any price.

## Designed for businesses with work to do

Think of all the different things your office has to do in a day. There's mail to answer, information to organise, memos to write, data to analyse, reports to generate.

Or perhaps you have books to balance, sales to forecast, or a payroll to calculate.

When you put an IBM JX on your desk you'll start to enjoy a powerful advantage in productivity right away.

Because the JX provides a high degree of compatibility with the IBM PC family, giving it an outstanding software library to draw from including the IBM DisplayWrite Series, IBM Assistant Series and Lotus 1-2-3.

The wide range of easy-to-use IBM software helps novice users quickly become productive.

## IBM JX can grow with your needs

The new IBM JX is not only easy enough to be your first small business computer — but powerful enough to be the only one you may

ever need.

It's designed to grow with you with standard interfaces that enable it to accept a wide variety of add-ons — including future technology yet to be realised. You can grow memory — up to 512KB. Add data communications capability and create an economical cluster of JX's with an IBM PC XT or PC AT.

It's also easy to attach any of a wide range of printers for correspondence or graphics.

And because the IBM JX has numerous ports and interfaces, you can add a 5.25 inch PC-compatible disk drive, a light pen, joysticks or a mouse to help you control your cursor on the JX screen.

Most importantly, you can be confident that because this computer comes from IBM it will adapt to your needs as they change and grow.

## New 3.5 inch diskettes

The JX is the first IBM computer to use the advanced new 3.5 inch diskettes — hailed as the storage medium of the future.

They may be only one third the size of a conventional diskette, but they hold the same amount of data.

And just as important, the diskette itself is protected inside a rigid plastic case, safe from dust, scratches and fingerprints.

## High-Resolution, 16 colour display — standard

The IBM JX monitor provides a bright,

*The new IBM JX: not only easy enough to be your first small business computer — but powerful enough to be the only one you may ever need.*

clear image for both text and colour graphics. IBM achieved this by treating the screen with a special non-glare material that doesn't reflect room light. The dots that make up the image are very small, so the resolution is very clear.

In medium resolution mode the IBM JX monitor produces 16 colours at one time for impressive colour graphics. In high resolution mode it produces four colours. A triple-chord speaker is built in.

## Choose the keyboard that suits you

The IBM JX offers you the choice of two precision-touch keyboards. They both use the proven IBM Selectric typewriter layout to help make typing quicker and more comfortable; both have an infra-red remote option.

## Choose the power and performance you need

Your authorized IBM dealer can show you how easy it is to put together a JX system that meets your needs now and as far into the future as you want to plan.

Remember, whatever you decide, you'll always value the assurance and support that owning an IBM product can bring.

The IBM JX Personal Computer.

The waiting is over. See your authorized IBM dealer now.

# IBM

# PC World show: We Were There

## A show of successes, promise...and despair

**PAUL CROOKS** joined the 70,000 people that crammed into the Olympia Stadium in London during the five days of the Personal Computer World Show in September. He reports...

The smell of success and, if not failure, at least decay, lingered around different stands in the stuffy atmosphere of the Olympia Stadium.

In the first category three A's dominated — Atari, Apricot and Amstrad.

The latter category included Acorn, Sinclair and MSX.

Commodore fitted uneasily into a neutral category.

Atari dominated as far as floor space and the show's hardware highlight was concerned.

That highlight was the Atari 520 ST — and Atari was making every effort to ensure nobody could doubt it was going to be a success.

On hand were all the Atari top brass from Jack Tramiel down, and by my count, at least 24 software companies demonstrating software for the ST.

The fact that most of that software, which included word processors, spreadsheets, utilities, languages, games and even some vertical packages, would fall over if you pressed a couple of keys seemed almost irrelevant.

### Conviction

Tramiel has succeeded, at least in England, in convincing many of the major software houses (Atari claims a total of 80 are working on software for the ST) that the ST is going to sell in large enough numbers to justify them racing to write software for it.

A representative of a mail order house told me they had sold 60 STs in the first



One of scores of Atari 520 ST computers at the PCW Show.

three weeks of its launch — with next to no software available and with only monochrome monitors, as colour monitors were in short supply.

Nevertheless it is too soon yet to say the ST will be a success. (Readers can expect the ST to be available in NZ with a price tag of around \$2500 early next year).

Atari also displayed a 260 ST (256K of RAM) with a built in disk drive, and a Winchester hard disk for the 520 ST. But these were kept in a large glass case — indicating they were only prototypes.

Not far behind the ST in terms of crowd attention was a much more down to earth hardware product — a word processing system.

### Irresistible

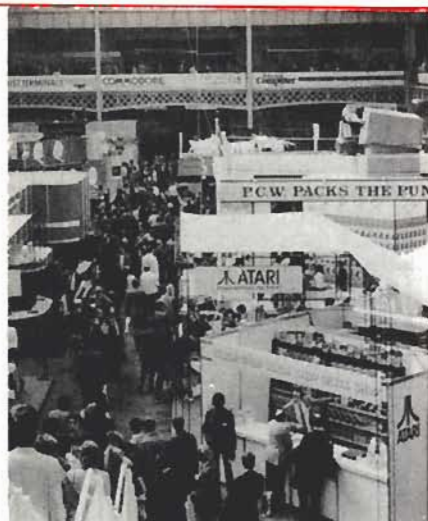
Boring you might say, but a price tag of £399 (NZ\$1000) for a 256K CP/M computer, one disk drive, monitor, word processing software and a printer is sure to prove irresistible to many people.

At that price level the PCW 8256 could only come from Amstrad — a company that has turned the low end computer market in Britain upside down in the last year.

While the PCW is configured to suit word processing (the bundled software, Loco Script, was written especially for the computer and uses to full advantage dedicated keys, printer features, the 90 x 32 screen and other hardware features), it runs the CP/M Plus disk operating system — which means any CP/M programs converted to Amstrad's unusual 3 inch disk drive can be used.

The number of these programs is sure to increase as Amstrad also had on display a 128K CP/M Plus version of its home computer range. The CPC 6128 also costs £399 with a built-in 3 inch disk drive and colour monitor.

However the CPC 6128 (which should now be available in New Zealand) has raised controversy here as originally Amstrad stated it would only be sold in America and the existing 664 (which has only 64K of RAM and an inferior version of CP/M) would be sold elsewhere.



### Rubbing salt

Then Amstrad announced it was dropping the C64 and replacing it with the C128 which, to rub salt into the wounds of C64 owners and dealers carrying C64 stocks, would also be cheaper.

Nevertheless, as a result of its aggressive pricing, which started with its original micro the CPC 464, and technique of bundling peripherals in the one price, Amstrad is now number three behind Sinclair and Commodore after only 15 months in the marketplace — and appears to be going higher.

To try and compete, Sinclair has slashed the price of the QL from £399 to £199 (NZ\$500) and has announced bundled deals for the Spectrum Plus (computer, data recorder, speech synthesiser, joystick, for £149).

Sinclair also finally reached agreement with its creditors over its £15m debt (the newspaper baron Robert Maxwell withdrew his offer) and reportedly sold 160,000 computers to a large retail chain (although this is only part of the stockpile of unsold Sinclair computers).

The Sinclair stand at the show, even with half price QLs, was hardly a hum of activity and rumours of a 128K Spectrum and a portable micro (the Pandora) aren't going to save the company from even tougher times after the Christmas selling season.

### Acorn out

One company that is already finished as a mass computer manufacturer is Acorn — now owned 80% by Olivetti, which recently rescued it for the second time this year.

This Christmas should see the last of its stocks of Electron and BBC computers sold off and after that it seems Acorn will concentrate on educational and scientific markets for its BBC Plus compu-

(Continued on page 8)

(Continued from page 7)

ter, which has 64K of RAM (a 128K version is also on the way).

To this end Acorn launched at the show a 32 bit co-processor for the BBC.

Called the Cambridge co-processor and based on the National Semi-Conductor 32016 chip, Acorn claims in benchmark tests it performs as fast as popular supermini class computers.

A one megabyte RAM version of the co-processor costs £1700 (NZ\$4300) while Acorn has also launched a stand alone version called the Cambridge Workstation (which is faster again). A one megabyte of RAM model with monitor and twin 640K floppies sells for £4395 (NZ\$11,000).

### Amiga

Commodore decided to launch the C128 in Europe at the PCW Show — and its staff were deluged with questions...not about the C128, but about the Amiga (see separate story), which wasn't displayed.

One question that did come to mind about the C128 though is, at £450 with a disk drive, how is it going to compete with the Amstrad 6128 at £399 with a disk drive and a colour monitor?

Also, software houses don't seem to

be rushing to write software for the 128 mode — which means the only immediate advantage in buying a C128 over a C64 is access to CP/M Plus software. This advantage isn't going to strongly appeal to home users, so the computer is aimed at serious or business users.

At least Commodore recognise this fact and state they are aiming it at a business market.

### Hotel giveaway

Amstrad has also forced Commodore into price cuts and bundling. One recent C64 package included three nights hotel accommodation...as well as the C64, data cassette and programs, for £200 (NZ\$500).

More drastically, the Plus 4 has been halved in price to £99, inclusive of data cassette — Commodore recently admitted the Plus 4 and C16 would be dropped after Christmas here.

There are rumours of Commodore launching a Unix-running computer but none were on display.

The prize for the most boring stand at the show must go to MSX. Sony, Toshiba, JVC and Mitsubishi all displayed MSX models on the stand, but left it poorly staffed.

Apricot's brightly lit stand dominated the business computer section.

With the release at the show of two more models in the "F" range, Apricot (formerly ACT) now has a range of eight PCs costing from £700 (NZ\$1800) to £3200 (NZ\$8000).

### Apricot down

Apricot PCs are clearly second behind IBM PCs in U.K. sales but soon after the show Apricot announced it was expecting a considerable drop in earnings for the past six months — indicating that not just the home micro makers face problems here.

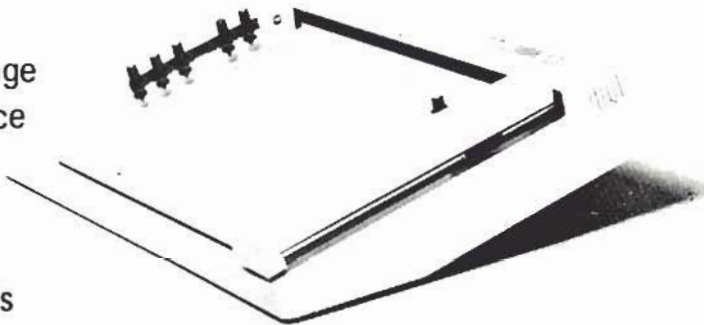
Philips arrived in force from Austria to display its new "Yes" personal computer range.

The low end model with 128K of RAM and one 720K 3.5 inch disk drive is expected to retail for £1000 (NZ\$2500). The Yes was launched in NZ this month, the base price being just above \$3000, without a monitor.

Digital Research's Dos-Plus operating system is supplied with the Yes, which uses the 80186 processor. The Yes can also run MS-DOS but Philips emphasise that its not "another clone" of the IBM PC.

# SEKONIC SPL-400 X-Y PLOTTER

- 6 colour automatic pen change
- On board Centronics interface
- 200mm/sec axial pen speed
- 0.1 mm step size
- 8 directional position keys
- 24 stored plotting commands
- RS 232C & IEEE 488 interface adaptors available



SPL-400: an extremely competitively priced digital X-Y plotter for the home enthusiast, draughtsperson or the latest in C.A.D. systems.

SOLE NEW ZEALAND AGENT

DEALER ENQUIRIES WELCOME



**E C GOUGH**

ELECTRONICS & INSTRUMENTATION DIVISION

E.C. Gough Ltd

Auckland: Phone 763-174  
Wellington: Phone 686-675  
Christchurch: Phone 798-740  
Dunedin: Phone 775-823



## PC World show: Look out for WIMPS!

WIMPs have arrived in force — if the personal computer world show was anything to go by.

But for once computer users and potential users should welcome this new technology.

WIMPs are Window, Icon, Mouse, and Pull down menus — also variously known, in typical computer industry jargon, as system user interfaces, user environment managers and front-ends.

System user interface is probably the best description as, with the use of windows, icons, pull down menus and a mouse, the programs provide a friendlier interface between the user and the computer's disk operating system.

The concept is not new (the first implementation was on a computer developed by Xerox in the seventies) and in the Macintosh it has sold well, despite other limitations.

Now the rest of the computer industry seems to have finally concurred that users should have a friendlier operating system and the ease of use of a mouse — rather than the sometimes complicated and hard-to-remember commands of traditional disk operating systems like CP/M, MS-DOS.

The WIMP leader is GEM (Graphics Environment Manager) from Digital Research, which can be implemented on any 16 and 32 bit computer running CP/M, MS-DOS, PC-DOS or Concurrent DOS operating systems.

Thus at the show GEM Desktop was being demonstrated on a wide range of micros, including Apricots, the Philips

:Yes, the IBM PC and compatibles (more than 20 manufacturers have now been licensed to use GEM with their computers).

But to get the full benefit of WIMP, applications software has to be written to take advantage of it.

Digital Research say more than 50 software houses have stated their intention to publish GEM-based application packages by the end of the year.

To set the ball rolling Digital Research itself has written and released a number of GEM application programs, including GEM Write, GEM Graph, GEM Draw and GEM Paint, while its DR Logo also uses GEM.

The popular integrated package Open Access has also been released in a GEM version.

GEM Desktop comes as standard on the Atari 520 ST and virtually all the applications written for that computer will take advantage of its windows and icons, and the mouse also comes as standard.

---

### World Show Software

---

Competitors for GEM include Microsoft's Windows, IBM's Top View, Epson's Taxi and Commodore Amiga's WIMP called intuition.

The first two have had development problems although Windows has finally been released. However, it reportedly makes heavy demands on the computer.

Intuition incorporates windows, icons and pull down menus but also allows those who wish to (such as software developers) to revert to the more conventional command line.

Among the other software on display at the show was a new development in training software for the IBM PC.

Called PC Automator, the program allows the insertion of special teaching instructions into popular application programs.

For example Wordstar is a popular word processing program, but it can be difficult to learn.

Using PC Automator, extra or enlarged explanations and instructions can be implemented on to Wordstar to help new users.

These instructions are activated either by the touch of a certain key (or combination of keys), or if a certain Wordstar screen message appears.

A simple example is if an "i" is typed before an "e" after a "c". A message is



**GEM Paint running on the Philips**  
:Yes computer — one of the new range of applications packages using WIMPs (windows, icons, mouse and pull-down menus).

activated to tell the user of his/her mistake.

A number of large companies in the U.K. are already using the package to help train staff in applications software.

It is expected to be available in NZ soon.

Regrettably I didn't have time to try out a lot of the new games software on show but I was disappointed visually with much of the offerings.

The exceptions were the few games programs running on the Atari 520ST — the graphics were a level above anything else on show. The only problem is how many people are going to be able to afford an ST to play games?

---

## Award for OPD

The One Per Desk (OPD) from ICL (reviewed as Computer Phone in last month's issue of Bits & Bytes) was the winner of the Micro Business Hardware Award announced at the PCW Show.

Other hardware finalists were: Omnireader, a low-cost text reader that allows typed pages to be entered into a computer without re-keying; ComNET 900, a local area network; and the Seiko Wrist Terminal, a watch-size device which can display information downloaded from a personal computer.

The winner of the software award was the Priority Decision System, a program that helps managers make decisions based on consistent priorities and policies.



Apricot's new F2 model — 512 K of RAM, twin 720 K 3.5 inch disk drives, a mouse and GEM for £1495 (NZ\$3750)

We  
Were  
There



## Amiga kept behind closed doors

While the PCW Show attracted a lot of visitors, only a select few were invited to Commodore's demonstrations of the Amiga at a nearby hotel.

Reluctant to steal the limelight from its own C128 computer, Commodore showed the Amiga to only a few software writers, dealers and journalists.

I was not among them, but I have seen an Amiga briefly since.

All I can say is that the graphics and sound capabilities of this computer live up to the word everyone has been using — stunning.

Last month I asked whether the Amiga is worth twice the price of the Atari 520ST?

For those who require such sophisticated sound and graphics and/or those who can afford the likely NZ price tag of

\$5-6,000 for a 512K system with colour monitor, I would say yes.

For those wanting straight business applications, the choice is less clear-cut. The Amiga does support multi-tasking, that is, you can run several programs at once, but it is questionable how useful this is to most users.

The Amiga is due to be released in Britain early next year — and if anything it has created more interest here than in the US (one Amiga review was headed bluntly "Get Lost Macintosh").

This is partly because the Brits have claimed the credit for Amiga DOS. It is an adaptation of an operating system called Tripos, developed by a British company called Metacomco.

Metacomco is entitled to produce similar software for other computer manufacturers — leading some writers

to predict it will become the standard operating system for 68000-based computers.

But the real strength behind the Amiga is the three custom designed chips cutely named Agnus, Daphne and Portia.

These chips handle functions such as memory control, input/output, graphics and sound, freeing the 68000 central processor to operate much faster.

Interestingly, among the peripherals that Commodore intends to offer is a 5¼ inch disk drive and PC-DOS emulator software that will allow the Amiga to run IBM PC software, including Lotus 1,2,3, Flight Simulator, etc, without modification. Talk about trying to cover all bases!

*Announcing the NEW...*

# INNOVA - RAM 512K

A SHORT MEMORY BOARD FOR THE IBM PC AND COMPATIBLES

- \*Compatible with Commodore PC10/PC20
- \*Compatible with Sanyo 775 and the New Executive
- \*Supplied standard with 256K installed
- \*Upgradeable to 512K by installing more ram chips
- \*Fits into short slots of Portable machines
- \*Local support with 12 month Warranty

256K installed

**\$475**

512K installed

**\$572**

CONTACT YOUR LOCAL DEALER

OR

INNOVATIVE COMPUTER SYSTEMS LIMITED

DEALER INQUIRIES ARE WELCOME

MANUFACTURED & DISTRIBUTED BY INNOVATIVE COMPUTER SYSTEMS LTD  
BOX 78-053, GREY LYNN, AUCKLAND, PH (09) 766-487

## First shots of price war

The first shots of a predicted price war in the home computer market were fired in early October when Commodore Computer NZ Ltd announced heavy discounts and consequent retail price cuts of up to 45%.

The C64 was reduced to \$549, and the 1541 disc drive came down to \$485 (from \$749).

It seems the momentum for a showdown had been building since March when Commodore gave notice to Fountain Information Services that its sub-distributorship (to mass merchandisers like Farmers) would end this December.

An orderly withdrawal however, didn't happen.

Commodore Computer NZ managing director Dick Anderson says an essential element to the decision to cut prices

was the retail market "going dead" and the increasing price competition from Atari since July.

"We had been hoping to launch the C128 about July to enable a repositioning (repricing) of other products but the C128 had still to arrive so we were eventually compelled to go ahead with repricing anyway," says Anderson.

The initial result was October's unit sales increasing 100% on September sales.

At Fountain IS, general manager Paul Williams refers to the price cuts being reflective of the market reality, and of Fountain's desire to exit from the home micro market.

In step with impending name changes to the organisation, Fountain is planning to concentrate on Altos processors and various modems and peripherals for multi-user computer systems.

Meanwhile Fountain was continuing to buy Commodore gear from Australia to supply its retail chain customers until the year's end.

Other micro brands also came down in price, but not as drastically.

## P.O. justifies monopoly

The Post Office's monopoly of the availability of Computer Phone is justified by product manager Norm Nicholls on the basis of the department's investment in "tailoring" the device to the local telephone system.

"Because there is no accepted standard for telephone devices worldwide, we have to put this kind of effort in and that is why we must retain control," he said. When international standards arrived, as they have in the computer world, the post office might have a different attitude to a range of competing devices.

This investment was required to be recouped from a relatively small market, and this further encouraged the PO to retain all distribution rights of ComputerPhone.

Some users however could be expected to be unimpressed with the PO's structures on the device's availability.

Customers cannot, for instance, purchase the device as they can in Britain and Australia.

The Australian purchase price for ComputerPhone is about A\$3000 (NZ\$4000).

Mr Nicholls however asserts that the rental-lease plan reflects the "continuing commitment" of the PO to support ComputerPhone.

He added that ComputerPhone would not be a static entity (meaning it would likely be enhanced) and there was the possibility of similar but more advanced devices being introduced within the next few years.

For the monochrome ComputerPhone the cost will be:

Rental only - \$350 a month  
Two year term - \$230 a month or \$2000 plus \$120 a month  
Three year term - \$190 a month or \$2000 plus \$100 a month.

The colour monitor rates are about 40 percent more.

## New AT & T deal

Microprocessor Developments Ltd (MDL) has renegotiated with Olivetti Australia its contract of supply of AT&T micros and miniprocessors.

(American Telephone and Telegraph owns 25% of Olivetti worldwide.)

MDL marketing manager Ken Eagle says the new deal enables his company, as the NZ distributor of AT&T computers, to offer retail dealers the usual 30% margin.

Previously, says Eagle, no dealer was interested in the slim margin offered under the initial arrangement, and MDL was having to sell direct — selling only two AT&T systems up to last August.

Olivetti Australia agreed also to a lower pricing schedule to enable retail price cuts for AT&T equipment.

Since the revised pricing, eight AT&T systems (each costing upwards of \$50,000) have been sold and retail dealerships signed with Skellerup Microsystems and Business Computers Ltd (Chch), says Eagle.

Regarding rumours of financial troubles at MDL, Eagle says the company's biggest problem was in arranging adequate finance for the manufacture of EFT (electronic funds transfer) terminals next year — that contract, he says, being worth \$3 million.

## Plans stalled

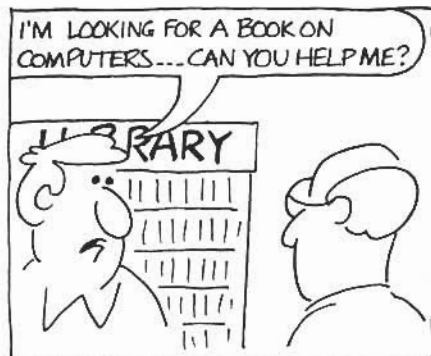
Microbee NZ's new Auckland centre will be temporarily unmanned and its operations centred in Wellington until January.

Manager Shane McKeown is meanwhile returning to Australia to help prepare the opening of a few more Australian branch offices.

McKeown says customers, mainly schools, would not be affected as all but one of Microbee's school users were in Wellington, and that was where support had to be concentrated during the next two months.

## 5.3 Gb disc drive

Data General has announced a 5.3 gigabyte (Gb) disc package for large mainframe and mini configurations. The disk package consists of nine 592MB discs and three intelligent disk controllers mounted in three meter-high cabinets.



## Printer premiere

The NZ distributor of Star printers, Genisis Systems, was conferred with a world first in launching Star's latest high-density dot matrix printer.

The only other outing for the 24-pin-head printer (the usual density has been nine pins) was at this month's Comdex Show in Los Angeles.

The launch here was acknowledging Genisis' claimed 70% share of the local printer market.

Officiating at the launch last month were Star sales managers Masanobu Takano and Masao Yamakazi, who told Bits and Bytes that dot matrix printers would retain the lion's share of printer business.

They say the "page printers", including daisywheel and laser-jet types, had less than 4% of the total market because of high price and slow form feed disadvantages. Although predicting this share would increase, to 17% by 1990, the number of dot matrix units would then total 12.5 million.

In step with slowed computer sales, printer sales growth subsided to 10% on last year's totals but they predict sales

being spurred by more advanced products such as the higher density "multi-pin-head", faster printing dot matrix to be launched by Star in the latter half of next year.

## Amstrad cuts

Amstrad's tape-driven 464 micro was reduced 30% in price in mid-October following the Commodore discounts.

Included were \$300 bundles of 464 software and joysticks cut to \$195.

Meanwhile the disc-driven 664 Amstrad sold out last month, according to distributor Grandstand Leisure.

Its successor, the disc-driven 6128 (with 128 K ram) was recently launched with a \$500 discount offer being made to schools.

In the US, the giant Sears-Roebuck chain recently launched the 6128 on to that fiercely price-driven market.

Amstrad's newest machine, the 8256, was expected to arrive here in bulk from Germany in mid-November, and will be priced at \$2400 (including printer).

## Atom images

In Zurich IBM scientists have made a new scanning-tunnelling microscope which can "zoom in" on atomic surface structures and make images of them.

## NEC multi-uses

Low cost multi-user and integrated accounting software from M L Systems, of Auckland, enables three-user configuration, complete with computer, printer, terminals and software, to cost \$16,500.

A single user NEC APC 111 could be expanded to multi-user capabilities, with each level of software able to be returned for a full credit when purchasing a more comprehensive level.

Another NEC development is the availability of Attache business software, previously running only on IBM computers.

## Computex 'live'

Computex went "live" on October 21. Initial services include a 300-frame notice board, and a teleconferencing ability for subscribers wanting to "talk" to each other.

Computex has mailed, to more than 3000 respondents, information on modem and software options enabling linkage to this videotex service.

## Presenting The... **TRIX** Range of COMPUTER FURNITURE

*\* Ergonomically Designed to beat repetitive strain injury (rsi) and provide greater comfort and efficiency.*

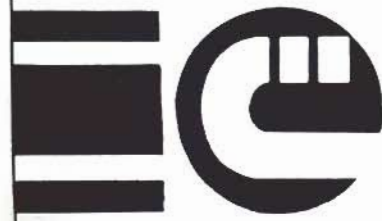
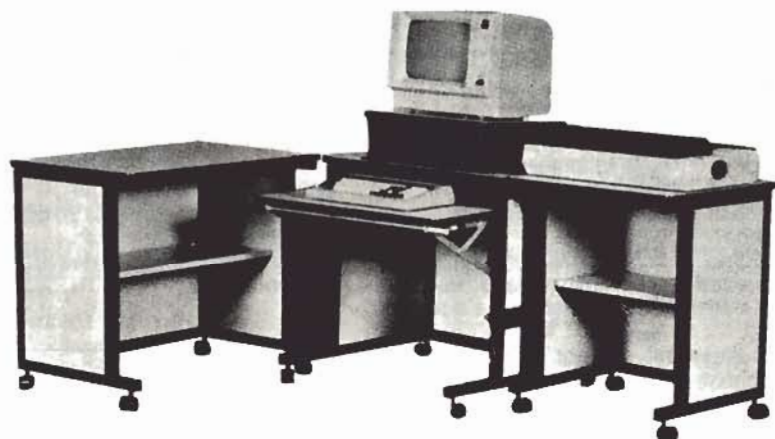
*\* Simple operator V.D.U. height adjustment.*

*\* Instant stable keyboard adjustment.*

*\* Simple operator tilt mechanism (2 way)*

**JUST SOME OF THE MAGIC YOU CAN  
PERFORM WITH OUR**

**TRIX**



**CUDBY & MEADE LTD**  
*The Quality Furniture Manufacturers*

FACTORY & SHOWROOM AT 69 PHARAZYN ST  
P.O. BOX 44-096, LOWER HUTT PH: 660-962

## The Spectravideo 738 "X'press"

## The X'press is almost there

By Mark James

I had originally intended to write this review on the Spectravideo 738 using the machine itself, and therein lies both the excitement and the disappointment of this seductive computer. That I should consider using this machine to edit a serious document shows that the 738 aspires to be more than an MSX "games computer"; but the fact that I am now back to Wordstar on an MS-DOS computer indicates how far Spectravideo still have to go in order to achieve their objective.

The Spectravideo 738, nicknamed X'press (or Express), is the first home computer on the New Zealand market to provide both MSX and CP/M.

As an MSX machine, it has very few faults. It adheres to the full MSX hardware configuration; its MSX Basic in ROM is complete; its graphics and sound capabilities are both satisfying and flexible; there is a full 64K of user RAM.

Its single cartridge port can run any of the growing range of MSX-format game cartridges. In addition, a 3 1/2 inch disk drive (360K of formatted storage) is a standard feature of the machine, and it is this that sets the X'press apart from other MSX computers.

Like the Amstrad 664 and the Commodore Amiga, the X'press is attempting to bridge the gap between home and business uses.

## Intelligent design

The X'press comes in its own carrying bag, intelligently designed with both hand and shoulder straps on the outside and pockets on the inside to hold cartridges, diskettes and documents. There are also compartments for cables and the rather hefty external power supply.

The computer itself looks somewhat like a white plastic version of the Hewlett-Packard 110 — you almost expect to see an LCD screen flip up.

The keyboard has 73 full-travel keys arranged in professional typewriter style except for the fact that the F and J keys are not dished. There are five programmable function keys, shifted to give ten.

The cursor control keys are large and have been arranged in an unusual I-shape. The caps-lock key has an LED indicator.

There are also keys marked "Graph" and "Code", each of them shiftable but not lockable; with these, 152 extra graphic, mathematical and foreign symbols can be produced on the screen from the keyboard. These, however, follow only the MSX standard; which means that you need to buy an MSX-compatible printer in order to print them.

The single floppy disk drive is located

on the right side of the computer, along with parts for dual joysticks and a cassette tape.

Most of the interfaces, however, are found on the back, protected by a long handle that pops out for carrying, or down for tilting the keyboard to a comfortable angle. Here are the on/off switch, the DC power input, a channel switch, and ports for sound, video and VHF output, as well as both a serial (RS-232C) and a parallel interface, and a port for an external disk drive. The only fault in this arrangement lies with the serial port, a nine-pin "D" connector, which sits right next to the disk port, a 25-pin "D" connector. Since the 25-pin "D" connector is also the most commonly-used RS-232 interface, people will likely confuse the two.

## Strange Dos

Apart from MSX Basic, which resides in ROM, the X'press supplies two other operating systems on diskette: CP/M and MSX-DOS.

The latter is a rather strange animal. If its name recalls that of MS-DOS, it is because both DOSes (as well as MSX Basic) were designed by American software giant Microsoft.

MSX-DOS has had a low profile in MSX literature, perhaps because Microsoft had assumed that there is no market for DOS-level hacking among those who might buy MSX computers.

The amount of effort that has gone into the design of MSX-DOS certainly does not reflect an immense respect for the "low end" of the computer scene.

MSX-DOS has been likened to an MS-DOS for the Z-80, and there are the familiar file-handling commands and programs (DIR, COPY, DELREN, FORMAT), and MSX-DOS file format is identical to that of MS-DOS; but sub-directories are not supported, and there is no CHKDSK program — essential to any serious use of the disk.

On the MSX-DOS diskette are two programs worth mentioning: WIDTH80 changes the monitor screen from 40 to 80 columns, without the necessity of extra hardware. The 80-column text is of poor quality when a television screen is



used as a monitor, but that is the fault of the television, not of the X'press.

On a low-resolution computer monitor, the X'press produces crisp, well-defined characters in either 40 or 80-column mode.

The other program is called 4-in-1; it's a combined memo writer, spreadsheet and filing program which, ironically, works only in 40-column mode.

The functions are simple but are not integrated.

Documentation is sketchy, but the program is easy enough to learn by trial and error.

The CP/M diskette contains the full CP/M 2.28, including Z-80 assembler and DDT. Experienced CP/M users, however will miss the usual "extras" such as NEWSWEEP.

With the STAT CON:=UC1: command, screen output can be made 80-column; one of the function keys is even pre-programmed with this command.

The CP/M diskette also contains a program called Scheduler, which performs five functions: a personal information file, a date-based diary, a name and address index, unit conversions (mostly metric to and from imperial), and a "world time" converter.

The sparse documentation warns the user not to run the Scheduler on the CP/M system disk, as "a fatal error may occur and damage the system disk."

## Disk performance

How does the X'press perform as a disk-based computer?

As a test of this, I decided to try to write this review using the memo writer func-

(Continued on page 14)

## Hardware Review

(Continued from page 13)

tion of 4-in-1. I quickly gave up.

The memo writer contains some useful features, such as insert mode and paragraph reform, but lacks such essentials as cut-and-paste.

In any event, serious text processing in 40 columns is pretty hopeless.

Not to worry, thought I, with CP/M there are plenty of 80-column editors around. Unfortunately, none were available on 3½-inch diskettes for the X'press — and if I dared copy the likes of Wordstar on to one, the copyright club might strike my RAM chips dead.

The only 80-column editor that I succeeded in getting to work was CP/M's pathetic line editor ED.

Still, I figured I had one trick left: both CP/M and MSX Basic have RS-232 communications programs. If I couldn't write the article on the X'press itself, I could at least use the X'press as a terminal on the AMPS system at the office and this way I would be sure of a decent full-screen editor.

The X'press software, however, let me down again. The CP/M program called RS232 supports every form of serial communication except terminal emulation. And the Basic CALL COMTERM function, like all of MSX Basic, operates only in 40-column mode.

Thus, while AMPS would happily converse with a 40-column terminal, I was still stuck with a 40-column editor. I had

to concede defeat; out came the Sanyo and in went Wordstar.

### More software

In fairness to the Spectravideo people, it should be said that no new computer has ever hit the market with enough software.

Computer Distributors do promise that plenty of CP/M and other software is on the way, including such popular programs as Multiplan and the MicroPro range. These, one would hope, will take advantage of the inbuilt 80-column feature of the X'press.

There is also a small but growing selection of non-game software available in cartridge form. I had a look at one, a Dutch database manager called MT-Base (NZ\$169).

It is flexible and powerful, containing a rudimentary report writer, and the documentation is thorough. However, this is generic MSX stuff, and therefore, strictly 40-column; the 80-column feature is again wasted.

---

In fairness ... no new computer has hit the market with enough software.

---

A word on documentation: that supplied by Spectravideo is of mixed quality.

The CP/M manual is good, with examples presented at appropriate points.

The MSX Basic reference manuals — there are two of them, one for standard commands and one for disk commands — are fairly complete, but the Basic programmer will find it annoying to have to switch back and forth between them.

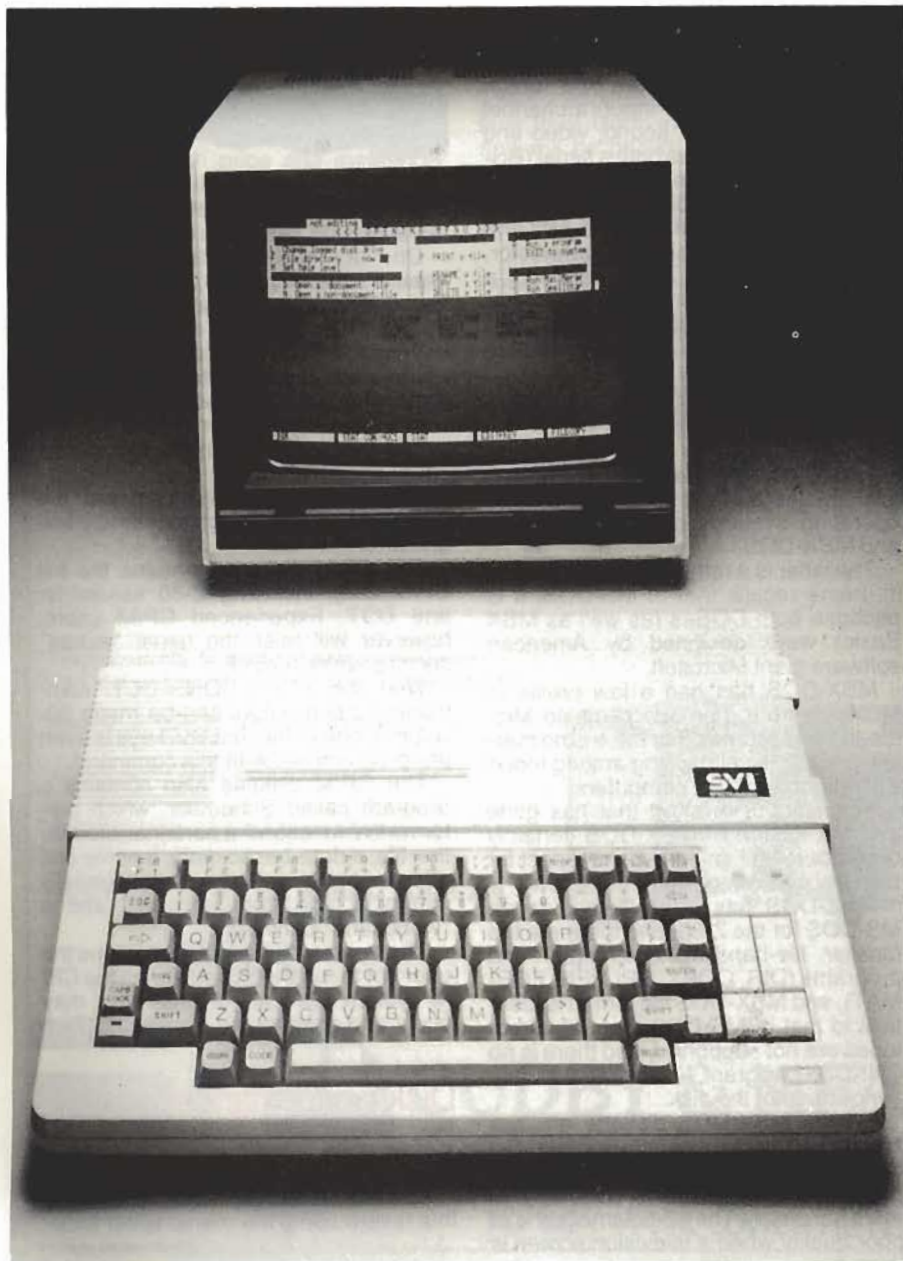
The MSX-DOS guide is long on hype and short on readable English, but it does cover plenty of technical detail, for those interested.

Finally, the SV1-738 User's manual, although essential for first-time users, should quickly find its way to the back of the shelf and stay there. (The English is a Chinese version.)

There are two non-Spectravideo manuals that are well worth recommending to anyone wishing to program on an X'press. They are:

The Complete MSX Programmer's Guide, by T. Sato, P. Mapstone, and I. Muriel (Melbourne House, NZ \$79.95). The word "Complete" should be read "Complete Basic". This is well-presented and full of examples and explanations.

Starting Machine Code on the MSX,



by G. P. Ridley (Kuma, NZ \$19.95). This is a fine beginner's guide to Z-80 assembler.

The world has not been kind to those who have tried to cross the divide that separates home and business computers. Even IBM failed with its overpriced, underpowered PCjr, and Apple's attempts to work both markets have only lost them the coveted praise of Wall Street.

On the other hand, the outlook for pure MSX might not be bright, either. The world market for cheap game computers is at best uncertain, except perhaps in Japan, and there are too many manufacturers trying to supply a demand that has stagnated since 1983.

The Spectravideo 738 X'press is solid on the game front, and it has taken an important step in augmenting MSX with a floppy disk, 80-column display and CP/M as standard equipment.

Its abilities as a more serious computer are hampered, however, by the present lack of 80-column software available.

But given better software, the X'press deserves to succeed.

*Mark James, the reviewer, is support manager with Advanced Management Systems in Auckland.*

## Microcomputer Summary

|  |  |
|--|--|
| <b>Name:</b>                               | Spectravideo 738 "X'press"   |
| <b>Manufacturer:</b>                       | Spectravideo, Hongkong.  |
| <b>Microprocessor:</b>                     | Z-80A  |
| <b>Clock speed:</b>                        | 3.579 MHz  |
| <b>Memory:</b>                             | 32K ROM (MSX Basic)<br>64K RAM (24456 bytes available under Basic)<br>plus 16K video RAM.  |
| <b>Input/Output:</b>                       | MSX cartridge slot<br>Inbuilt 3 1/2-inch floppy disk drive<br>Port for second (external) floppy drive<br>Centronics printer port<br>RS-232C serial port<br>Dual joystick ports<br>Cassette tape port<br>Video, audio and VHF output. |
| <b>Keyboard:</b>                           | 73 full-travel keys (including 5 shiftable programmable function keys and 8 editing keys).   |
| <b>Display:</b>                            | Text up to 80 x 24 characters; graphics<br>256 x 192 pixels;<br>16 colours, 32 sprites.  |
| <b>Languages:</b>                          | MSX Basic, Z-80 assembler.   |
| <b>Sound:</b>                              | 8 octaves, 3 voices plus 1 noise channel.  |
| <b>Cost:</b>                               | \$1195.00.   |
| <b>Supplied accessories:</b>               | VHF monitor cable, 2 diskettes, 5 manuals,<br>power supply and cable, carrying case.<br>Second disk drive \$795, printers from \$699.  |
| <b>Options:</b>                            |  |
| <b>Reviewer's ratings:<br/>(5 highest)</b> | ease of use 4, expansion 5, support 4,<br>documentation 3,<br>language 5; value for money 4.   |

*(Review unit supplied by Computer Distributors, 46B Taharoto Road, Takapuna.)*

ADVANCED AND EVER ADVANCING MITSUBISHI ELECTRIC

# INFORMATION... NOW SEE IT IN A NEW LIGHT



The new 16 colour, AT-1332A 14" colour monitors from Mitsubishi Electric are just what's needed to liven up a software package. They offer a peripheral for all educational, CAD/CAM or imagineering needs that's hard to match for quality or value.

### LOOK AT THE FEATURES

- Full IBM compatibility, to name just one!
- True medium-resolution colour that's right up to top international standards.
- DM anti-glare screen.
- 640 x 200 pixels resolution, 0.4 mm line mask pitch.
- Unsurpassed colour quality and definition.

For more information, including details of high resolution colour and monochrome monitors, please contact:

NORTH ISLAND: Melco Sales (NZ) Ltd.  
P.O. Box 30-772, Lower Hutt  
Tel. Wellington (04) 663-107  
SOUTH ISLAND: Solstat Industries Ltd.  
P.O. Box 13-183, Christchurch 1.  
Tel. (03) 588-202.



**MITSUBISHI  
ELECTRIC**

Dealer and O.E.M. enquiries welcome.

BGH 1895

D I A B L O



**... NOW  
THERE'S SERVICE  
TO MATCH.**

Now you can confidently expect a standard of service to match the excellence of the world's foremost daisywheel printers.

**MITSUI COMPUTER SYSTEMS LTD**

MITSUI COMPUTER SYSTEMS LTD, 15-19 WIGAN STREET, WELLINGTON. P.O. BOX 9447, COURTENAY PLACE. TEL. 848-069. TELEX MITSUI NZ3555.  
PRINCES STREET, AUCKLAND. P.O. BOX 4128. TEL. 395-686. TELEX MITSUI NZ2328.

DMM 9175A



# An innovation named Nimbus

By Peter Parsonage

*This is another IBM compatible but it is, in many ways, a more advanced computer. It uses a true 16-bit microprocessor, operates at a higher clock speed and stores twice as much data on smaller disks. With so many advantages it could be expected to command a higher price, but this is not the case. To achieve the specification to be described you may assume that it is manufactured in Asia. Again, this is not so. It is manufactured in England by Research Machines Ltd.*

As supplied for evaluation the computer included: the Nimbus computer unit, an IBM style keyboard (Nimbus), a Nimbus mouse, and a Roland (Japan) RGB colour monitor.

Software was very limited and I was only given an operating system (MS-DOS 3.1) and RM BASIC. The MS-DOS disk did include a "Welcome" program that demonstrated many of the features available.

## Hardware details

The computer is attractively packaged in a moulded case coloured in two shades of grey. It occupies only 75% of the desk space required for an IBM.

Two 3.5" disk drives are fitted as stan-

dard and below them are three slots, neatly concealed behind flaps to accommodate two ROM packs and a software "key", required for protected software.

A speaker is mounted behind the front panel for use with the inbuilt sound generator.

On the rear panel a selection of sockets are provided for the display (colour or mono), networking, a printer (serial with a non-standard connector), keyboard, mouse or joystick, and power outlets (230v AC, 12v and 5v DC).

The keyboard conforms to the UK standard IBM configuration but uses capacitance switching with resultant quiet operation, though a rather spongy feel. I have certainly used better keyboards.

A disturbing feature is the absence of indicator lights for the CAPS LOCK and NUM LOCK keys. This was a major deficiency on the IBM keyboard and has been rectified by most compatible manufacturers.

The tilt angle may be set to 5 or 10 degrees. This is a rather limited choice and again conforms to the IBM style with no improvement.

The monitor is a standard Roland unit available for use with a wide variety of computers. It is an attractive unit that performs well. The superb graphics features of the Nimbus give it a thorough testing.

The mouse is a neat unit that fits snugly in the palm of the hand. It has two buttons and worked well with a demonstration program.

The case opens easily to show a main circuit-board concealed beneath the disk drives and the power supply making access difficult. Three expansion slots are available with the fourth occupied by the disk drive controller.

Connection to the main board is by ribbon cable and pin connectors.

The volume control for the internal speaker is mounted on the main board accessible through a ventilation hole.

## Specifications

The important feature of the design for the Nimbus is the use of a true 16-bit microprocessor, the 80186.

The IBM and its compatibles use the 8088, a microprocessor which uses an 8-bit data bus but supports 16-bit operations. This, coupled with an 8MHz clock (the IBM clock is only 4.77MHz), should make the Nimbus much faster in executing programs.

With the limited software available I could only test the computational speed of BASIC using a simple benchmark program for which I have results for nearly 200 computers.

The Nimbus executed the program in 24 seconds, the same as the IBM PC.

*(Continued on page 18)*



**The RM Nimbus, a 16-bit micro from Oxford-based Research Machines Ltd, is based on an 80186 8MHz processor, VLSI gate array technology, dual-bus architecture and a separate graphics processor. Among new ideas is an input/output system called Piconet, which allows Nimbus to drive up to thirty peripherals or instruments from a single 1/0 port.**

(Continued from page 17)

This is 8 seconds slower than the ACT Apricot, and 66 faster than the Sanyo MBC-550.

The graphics display is handled by a separate VLSI processor and graphics demonstration programs operated with impressive speed.

I am sure that the theoretically superior 80186 would demonstrate its true capabilities in a networked application but I was unable to test this.

As supplied the Nimbus had 512K of RAM with a further 64K allocated to the screen. This can be expanded to 1 Megabyte and can be partially configured as a ramdisk (silicon disk) if required.

The two disk drives were 3.5" drives and could each store 720K. A Winchester (up to 40Mb) can be built in or an external Winchester may be used. A 5.25" disk drive can be added externally for program exchange with the IBM PC.

I can only speculate on the usefulness of these options as no catalogue or detailed data is available yet.

In a teaching situation where a networked system is used, a Winchester would be very useful.

### Work related

In my teaching experience (technical institutes) networking or any multiuser system is simply a nuisance foisted on to teachers by administrators and salespeople.

The students are keen to learn on a system similar to that which they are likely to encounter in a working environment. From that viewpoint I liked the Nimbus very much indeed.

I felt instantly at home with the MS-DOS 3.1 operating system because it was so similar to the PC-DOS 2.1 that I normally use.

The graphics resolution may be selected as high or low. High resolution gives a display of 640 X 250 with 4 colours (IBM PC is 320 X 200 with 4 colours or 640 X 200 in black and white). Low resolution gives a 320 X 250 display with 16 colours (160 X 100 for the IBM).

The demonstration programs clearly showed the graphic capability to be an outstanding feature.

The character set includes all 256 IBM characters and a further 256 that are user definable.

Lines can be plotted at a rate of

130,000 pixels (dots on the screen) per second and that is very fast. With the appropriate software the powerful graphics could provide useful displays for teaching within schools.

The alphanumeric font used is clear and easily read. I normally prefer the clarity of a green screen monitor but found no difficulty at all with the Nimbus colour display for text.

### Software

The disk format used prevents operation of IBM PC software directly and the importer had only RM BASIC available with documentation, although I understand that other languages are available.

I was offered some packages without documentation but declined as that makes fair evaluation difficult.

The availability of good software largely determines the future of a computer and I am sure that this will apply with the Nimbus.

It is priced towards the high end of the market and potential users will be concerned about the support likely from software suppliers. Educational programs for schools, require hundreds of man-hours to write. With limited resources within NZ, teachers will certainly be looking to see what is available from overseas sources.

Within Technical Institutes BASIC is still accorded high priority and the acceptability of RM BASIC remains to be seen. PASCAL and LOGO would further enhance the range.

For business applications it will be necessary to source database, spreadsheet, word-processing and accounting packages.

### Documentation

The Owner's Handbook is well presented in the familiar small ringbinder commonly used. It is clear, well written and would be readily understood by a complete novice.

Technical details are limited and a more detailed treatment would be essential for the experienced user.

The handbook for MS-DOS 3.1 supplied is bound, making it very awkward to use (especially when trying not to damage it). The pages are already punched and if it was mine I would take it apart and put the pages into a ring-binder.

It contains all the required information but the overall quality of presentation and typesetting is not suited to the fine computer with which it is supplied.

The RM BASIC book is A4 size and marked "preliminary edition". This is fortunate because it too is poorly presented. It does contain a good descrip-



## C. ITOH'S S+ RACERS

The C. Itoh 8510S+ and 1550S+ are the "fast lane" enhancements of the most popular range of C. Itoh printers. Proven over the past 3 years and now better than ever with -

- 180cps/106 lpm throughput.
- Near letter quality print (2 pass).
- Optional, low cost Automatic Sheet Feeder
- Colour versions: 8510SC+ and 1550SC+
- Centronics, RS-232-C, IBM PC (Epson) and Apple Imagewriter compatible versions available.

For the name of a dealer near you contact -

**CONTROL**

Phone (09) 600-687. P.O. Box 68-474, Auckland.

3129

tion of the BASIC commands available and sufficient details to allow a beginner to advance quickly with little additional assistance.

## Summary

The Nimbus is a very well engineered computer utilising advanced design concepts.

The overall standard of construction is high and the problems I have mentioned could all be corrected with little difficulty.

This is a very new computer and these problems are inevitable.

The importer, Barson Computers Ltd, has a proven record through their association with other products, in particular the popular BBC microcomputer, and if they support the Nimbus as well it should achieve a significant share of the market.

My main reservation concerns the availability of software. It is sufficiently different to the IBM PC and PC JX to make compatibility look doubtful.

With a price of \$6500 complete, it competes with a very wide range of personal computers.

## MICROCOMPUTER SUMMARY

|                     |   |
|---------------------|---|
| Name:               | RM Nimbus   |
| Manufacturer:       | Research Machines Ltd., England   |
| Microprocessor:     | 80186 16-bit<br>8051 (11 MHz) for peripheral control VLSI processor<br>for fast graphics<br>8087 (optional) coprocessor   |
| Clock speed:        | 8 MHz   |
| RAM:                | 512K plus 64K for screen  |
| ROM:                | System  |
| Input/Output:       | RS422 (Bell socket) serial for printer — Works with limited subset of RS232 RGB video DIN connector (IBM monitor)<br>Mono video<br>Power supplies: 230v AC, 5v and 12v DC<br>Mouse socket (Nimbus mouse supplied)<br>Piconet<br>Network |
| Keyboard:           | Three expansion board positions<br>Detached with coiled lead (IBM style)  |
| Display:            | 25 lines X 80 characters  |
| Graphics:           | 640 X 250 X 4 Colours or 320 X 250 X 16 Colours   |
| Languages:          | RM BASIC, RM PASCAL, RM LOGO (Only RM BASIC seen and tested)  |
| Sound:              | Inbuilt speaker   |
| Cost:               | \$6500  |
| Software:           | Yet to be seen  |
| Distributor:        | Barson Computers Ltd.   |
| Reviewer's Ratings: | (1-5, with 5 the highest) Ease of use 5; documentation 3; languages 4; expansion 5; value for money 4 (if features can be used).  |

## AFFORDABLE ERGONOMIC FURNITURE

SET YOUR TERMINAL OR COMPUTER ON SILKWOOD FURNITURE TO MINIMISE RISK OF RSI, INCREASE COMFORT AND EFFICIENCY!



# \$ 135.00

(in Auckland - Sept. 85) puts your computer on a Silkwood Copy Stand ECS2 (illustrated) on your present desk.

Surprisingly little more buys a full work station proved to be EFFICIENT and ERGONOMIC by thousands of Companies countrywide.



Silkwood copy stand ECS2

SILKWOOD COMPUTER FURNITURE MODULES ARE AVAILABLE FROM GOOD RETAILERS. BROCHURES, DATA SHEETS, OUTLET ADDRESSES AND FREE CONSULTANCY ADVICE FROM -

**Silkwood** Manufacturing Limited  
8 TIRONUI ROAD, PAPA KURA. PH. (09) 298 7089

## SEE the complete SILKWOOD range



SILKWOOD  
WORK STATION



Silkwood  
DATA CENTRE



SILKWOOD 'MULTI'

...and MORE

# FOR THE VERY BEST IN FLOPPY DISKS



**THINK Verbatim®**

**WORD PERFECT FOR LIFE**

Contact: Verbatim New Zealand Limited

Wellington 858-615

Or: Your Local Computer Store

**THE WORLD'S BIGGEST SELLING FLOPPY DISK**

Verbatim. 

## Juki 2200 typewriter/ printer review.

I read with interest John Slane's review of the Juki 2200 typewriter/printer in the Sept. 1985 issue of Bits & Bytes, but a very important short coming with the parallel interface version was not mentioned.

The parallel interface conforms to the Centronic format except that the P.E. (paper end) signal is not generated, so unless your word processor program "dumps" to the printers 2K buffer in "one page lots", and then waits until commanded to continue, the printer will cheerfully print away, irrespective of it having paper or not?

This problem can be got around if you "hover about" while your document is being printed, and quickly disable the print mode (Control Z) when near the end of the page, load a fresh sheet of paper, and then enable print mode, (Control P), again.

But this is a little "hit and miss" and leads to some pages having more lines than others, which can look messy on an important document.

Apart from a few shortcomings I am very happy with my Juki 2200 typewriter, which satisfied my requirement for a "letter quality" printer and portable typewriter at a reasonable price.

I must congratulate you and your staff for an excellent magazine. I have been a subscriber from the "word go", and with every issue you go from strength to strength. Keep up the good work.

Andrew Court  
Wellington

Dear sir,

I read with interest the review by John J Slane and surprisingly I find much I can agree with. The question of capacity or large volume work load will never be challenged by this office. I am very honest in, where possible, qualifying the likely work load prior to making the sale. It should be remembered that all Juki 2200 users have a 14-day trial period to assess their usage against the performance of the Juki 2200.

There are one or two review statements that do require a response.

The Juki correctable carbon ribbon is rated at 400,000 characters and can be purchased from Action Line in dozen lots at \$11.70 each, or 58 cents per 2000 character page.

A better alternative, of course, is the new Juki Fabric Ribbon. This is rated at 400,000 characters and sells for \$13.50 each. Using this ribbon the page cost reduces to 7 cents per page.

The question of speed was not fully presented by Mr Slane. We agree that 10cps is not earth shattering, but when compared to a "dedicated" low cost



daisywheel printer operating at 14cps the difference is minimal.

To print a 2000 character document on the Juki 2200 takes 3.33 minutes. This stated in "tea-drinking" time may suggest that "instant coffee" may be a better choice than "Brooke Bond". Indeed using a 14cps printer only saves 55 seconds — or one less "slurp" of your beverage.

With reference to the 2K printer buffer on the Juki 2200, we were surprised at Mr Slane's disappointment. In fact when we analyse your own "daisywheel printer" round-up published in July 1985, we find that the Juki 2200 is the only machine under \$1000 to boast a 2K buffer.

Indeed you need to spend closer to \$1500.00 for this feature.

In conclusion we do agree with the reviewer that the Juki 2200 fills a need in the market which demands both an electronic typewriter and daisywheel printer.

The Juki 2200 has been placed with many small companies and small departments in large organisations which demand a genuine dual purpose capability.

George J Bright,  
General Manager  
Andas Actionline

Dear sir,

We have been invited to voice our opinions on the contents of Bits & Bytes. By and large I would say it is fairly satisfactory as it is.

Now, speaking for myself, I would like to see more programs published; particularly of the more serious kind, including subroutines that could be incorporated in one's own programs. Utility programs are always welcome.

Information and circuits on how to add ports of various types, how to make simple A/D convertors and any ideas at all along these lines are much appreciated.

I like what Gordon Findlay has to say and Joe Colquitt's type of article.

I own an Amstrad with Disc-drive, though I built my SC/MP with Nibbyl Basic way back in '79. Later I made an S-100 Computer.

I am not the least interested in Bill Smith leaving Wig-wams and going to Whata-it & Co. I also feel that reviews may be a bit overdone.

Thank-you for giving us the opportunity to express ourselves in this way.

E.J. Brown  
Cambridge

Dear sir,

I have been a subscriber to "Bits & Bytes" since January 1984 and I enjoy reading it virtually cover-to-cover each month. It's superior to any other computer magazine offered in NZ, Australia, USA or UK at present.

I am now ready to invest in a PC, but I would love you to review the Spectravideo 328, and Apple 2e, to make any decision easier. I know the 328 has been out for 18 months now and that you reviewed the 318 in December 1983. However, the 328 is different, has been enhanced since its first release in NZ, the peripherals are how available (and hence reviewable) plus prices have dropped significantly (from \$1495 to \$895).

The 2e has been around a long time but in view of recent "enhancements" and much reduced costs I should love to know how it stands amongst the competition today. I refer to the \$3995 Busi-

(Continued on page 23)

**UNIVERSITY  
BOOK SHOP**

**Specialists in  
COMPUTER  
BOOKS**

**Over 1000 titles  
in stock**

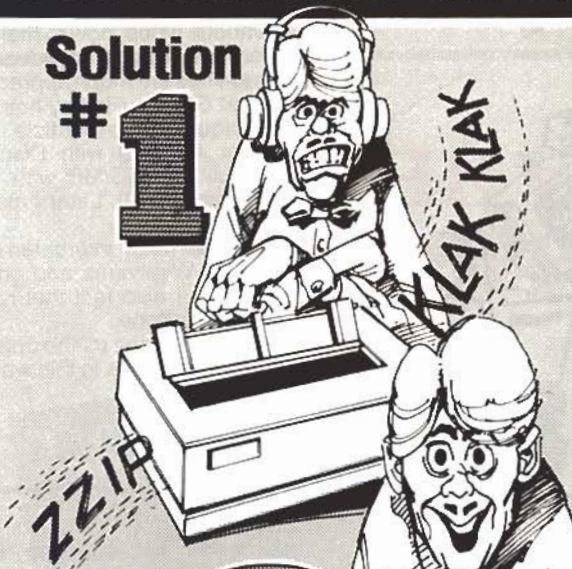
PHONE OR WRITE VISA BANKCARD

STUDENT UNION BUILDING  
34 PRINCES ST AND 19 HIGH ST  
AUCKLAND 1  
TELEPHONE 771 869

# Office Problems: Series 5-NOISY PRINTERS

**Solution**

**# 1**

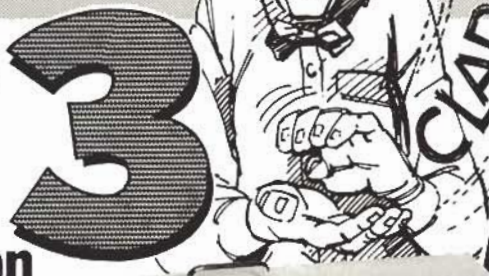


**Solution**

**# 2**



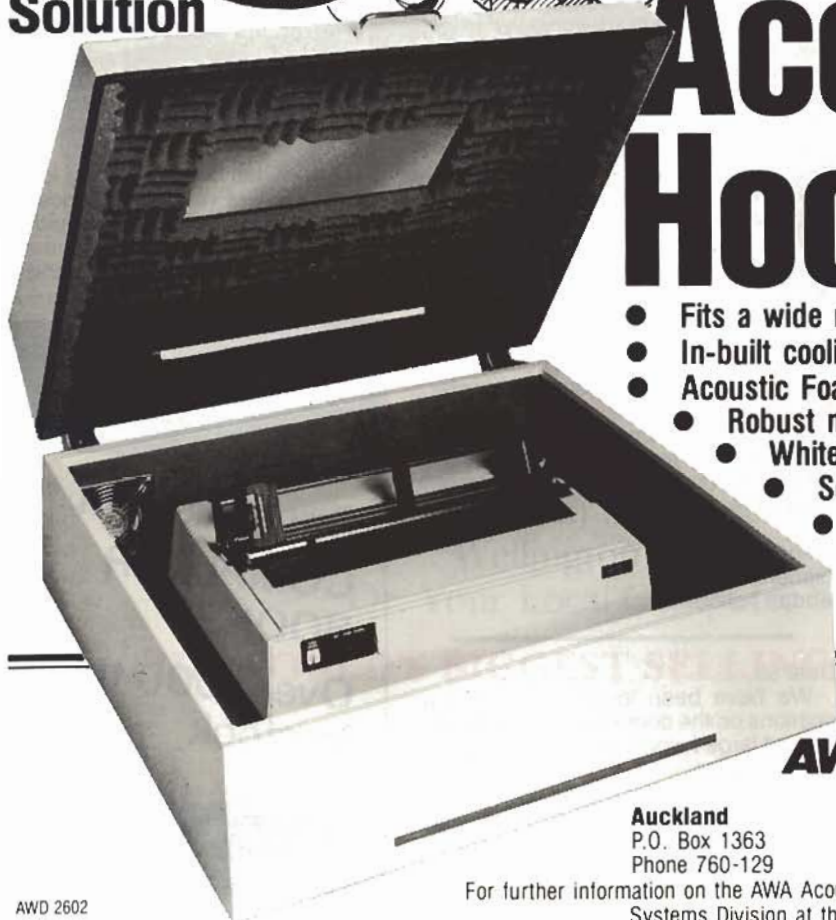
**# 3**  
**The Final Solution**



# AWA's Acoustic Hood

Effective Silencing For Office Printers

- Fits a wide range of printers
- In-built cooling system
- Acoustic Foam lined
- Robust metal construction
- White "powder coat" finish
- Self propping lid
- Trolley or desk mount
- "Customised" construction available



Guaranteed by:

**AWA New Zealand Limited**

Data Systems Division

**Auckland**  
P.O. Box 1363  
Phone 760-129

**Wellington**  
P.O. Box 50248  
Phone 851-279

**Christchurch**  
P.O. Box 32054  
Phone 890-449

For further information on the AWA Acoustic Hood write or Phone AWA Data Systems Division at the office nearest you.

(Continued from page 21)

ness Pack (128K RAM 2e, monitor with built-in 163K duodrives, 80-column card, Appleworks, . . .).

I appreciate that you really have your work cut out reviewing brand-new models. But, as the 328 and 2e appear excellent buys in the "advanced-home-computer-potential-business-computer" category, a fresh look would be most welcome indeed.

Chris Marshall  
Auckland.

*The choice, ultimately, is the buyer's.*  
— Ed.

Dear sir,

I think Bits & Bytes is very good for a NZ mag. It's the best in fact, but it would be better if:

- 1) it had a buy, sell and swap input free of charge.
- 2) a mailbag section so people can write in.
- 3) a bug hunter section where people can write in and inform others about bugs in commercial software.
- 4) paid people for their programs (listings) so more people would send them in.

5) got people to review their own software.

6) you had an 'adventure' on tips, help, etc.

R.M. Adair  
Gore

*Editor's response:*

- 1) space precludes free advertising.
- 2) this is a mail section.
- 3) I am keen to receive readers' tips and insights.
- 4) we do pay for published programmes.
- 5) software reviews have to be objective.
- 6) tips on game play are of very limited application.

Dear sir,

My son is a subscriber to Bits & Bytes, which I like to look at as well.

Our Company has been issued an IBM, PC, AT computer.

As our staff are "computer laymen," we note your publication of programs on business applications e.g. the "sort program" in July.

Programs on sequential and random files, and recipe costings would be enlightening, as would be data base, Lotus Symphony spreadsheet exam-

ples similar to the "House Buying Program" (May '85 issue).

There is an increasing supply of books on programs, but where does one draw the line on the correct choice?

Keep up the good work with your publication.

L.A. Hibbard.  
Christchurch

## Farm software

Barson Computers (NZ) Ltd, distributor of the BBC microcomputer, has announced the release of a Farm Management package for the BBC.

Developed by Rural Planning Services, a UK agricultural consultancy, the initial package consists of four modules: FarmCash – a computerised cashbook; FieldFile – for keeping comprehensive records of up to 80 fields; FarmPlanner – for easy access to sophisticated farm planning techniques; Capcost – an investment appraisal program.

The software is to enable more informed decisions, and consequently improve management and financial control.

## PC POWER LTD SOFTWARE IMPORTERS

P.C. Power has a large range of software and utilities for IBM PC's and Compatibles – If we haven't got it we'll get it.  
SERVICE & HELP GUARANTEED

**IF YOU HAVE AN IBM PC OR A COMPATIBLE, CONTACT US AND WE'LL SEND YOU A LIST OF ALL THE SOFTWARE THAT IS CURRENTLY AVAILABLE FOR YOUR MACHINE, AND ANY NEW RELEASES IN THE FUTURE.**

### STOP PRESS

**THE NEWSROOM** – designed to stimulate creative journalism. Ideal for all ages! **\$225.00**

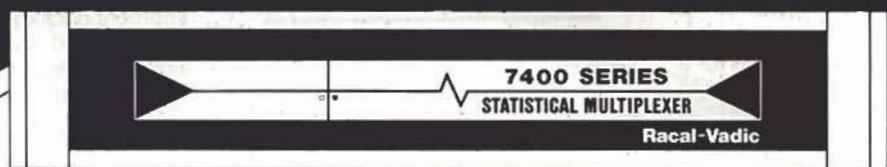
**CHART-MASTER** – Number 1 Charting Package in the USA. New version now available with datagrabber! **\$945.00**

Contact **PC Power**

1st Floor, Apex House, Cnr. Queens Drive & Laings Rd, P.O. Box 44-161, Lower Hutt, Phone (04) 693-050.

**DEALER ENQUIRIES WELCOME**

# NEW

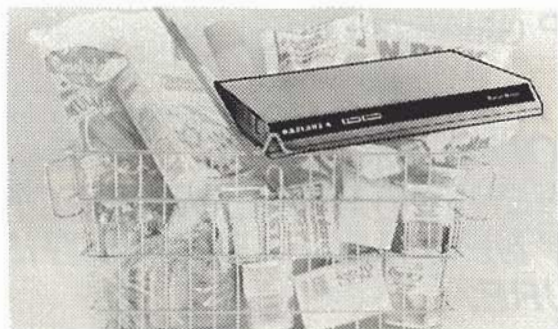


## Now a multiplexer/modem at a supermarket price

Now it's a lot easier to own a mux, and a good deal less expensive. Because when you connect our 7400 Series statistical multiplexer to an ordinary phone line, you pay only for the calls you make. The 7400 has many features,

including configuration and remote diagnostics. The 7400 sends data over leased lines too. When you want to combine multiplexer benefits with those of a modem, it must be the Racal 7400.

### Other options! Omnimux Multiplexers and Mark 46 and 98 Modems



For bottom shelf prices on multiplexers with top shelf features, see the low cost Omnimux Multiplexers that take all the top quality, reliable Racal-Milgo technology and package it into attractive, efficient and low cost units. The Omnimux 4 and 8 each offer asynchronous statistical multiplexer facilities with independent channel configuration. Both provide superbly reliable, flexible and efficient data transmission at truly cost effective prices.



The Racal Mark 48 and 96 Series Modems feature proven Racal-Milgo technology and tried and true reliability, yet at truly economical prices. Both operate in point-to-point or multi-drop applications.

#### Further action

Contact the Racal-Milgo office nearest you for full details of the new 7400 and the low cost modems and multiplexers available.

## Racal-Milgo

Racal-Milgo New Zealand Limited

PO Box 26-143 Auckland

Phone: 504-309 Auckland. Phone: 730-313 Wellington

**RACAL**



# Disc drive for Spectrum

By Lindsay Hunter and Roger De Salis,

of the Wellington Spectrum Users Group.

The Opus Discovery is a disc storage unit offering a conventional alternative to Sinclair's own microdrives.

Discovery 1 is a black box, with a flat base plate extending out the front on to which is mounted the Spectrum, containing a single 3 1/2" 180K disc drive, a board containing all the required electronics, and a power supply internally which powers both the Opus and the Spectrum.

In addition is a through-connector, Centronics printer interface doubling as an 8-bit bi-directional parallel I/O port, "Kempston Standard" joystick socket and composite video-output-phonos socket.

The unit is not compatible with Sinclair Interface 1.

## Manual

The manual supplied with the unit was excellent, in places surpassing Sinclair's IF1 manual in the way that channels and streams are explained, how each command is used, and short demonstration programs to illustrate each point.

The extended BASIC commands such as OPEN#, CLOSE# and MOVE etc are supported, but information seems to come to a complete stop if data is required for hardware device addresses, access methods via machine code to the various peripherals. This is a shame as the unit is so good in all other respects, and one hopes this information is forthcoming in some form.

The unit has a full complement of error messages, but examining the ROM revealed one undocumented error message. I should love to know which incorrect command sequences produces "Don't be a wally!".

There is full support of channels and streams, but a dual syntax for some commands: the standard command ERASE "m";1;"myfile" which can be replaced by ERASE 1;"myfile" has the effect of erasing "myfile" from the disc, and reporting if the file was not found. But ERASE "m";1;"myfile" also kills "myfile" if it was there, but does not produce a report, even if it wasn't? Similarly with the SAVE command.

"Breaking" during a drive operation leaves the drive motor running and the computer back in Basic. Any subsequent operation that is allowed to complete, will turn it off.

## Printer support

The ZX Spectrum access to peripher-

als through Interface 1 requires the use of OPEN commands.

Due to the use of tokens and keywords, output is either sent directly, or edited into ASCII, i.e. character by character. The latter is necessary for printer formatting and graphics.

Similarly, the shadow Rom in the Opus supports the printer using OPEN# 3;"t" for text, and OPEN# 3;"b" for binary.

The manual makes several references to the ability to input data using the parallel port, but is vague in the way this may be achieved.

Opus emulates microdrive Basic, and we encountered no problems running Basic programs.

Changes may be required concerning the printer, namely OPEN#3;"t" in a basic line somewhere in the program prior to any LPRINT or LLIST statements — very similar to opening the serial printer interface on Interface One. A neat aspect of the printer software is it being all in the shadow 8K Rom, overcoming the problem of where to put the parallel printer driver software.

## Space problem

One problem in running was the channel and map area required to access the disc being slightly larger than the 600-700 bytes required for a microdrive operation, so any programs that are short on space may require the removal of a few lines so the "Out of Memory" message is not displayed. My extensively modified version of Tasword 2 had to have about 6-8 lines removed to make it run.

In operation, request for a directory is pleasantly fast, but the actual time taken to load/save programs/code was surprisingly lengthy. We converted a well known flight simulation program that loads from Microdrive in 7 seconds; but from the Opus disc 22 seconds was required. This time factor was consistent throughout the use of the drive for any disc operation.

Another difference is that microdrive is effective in space utilisation on the cartridge, but the Opus appears to need a sequential space larger than the file size to actually write the file to disc.

I was attempting to save a 10K file with 29K free space on disc, and was rewarded with "No Room on disc".

Erasing files, or performing a disc tidy operation (included as a special Opus command) allowed the file to be successfully saved.

## Disc backup

As the unit uses a paged Rom in the bottom 8K of memory, and a channel and map area in the same way as Microdrive Basic, it should be possible to load most applications.

Transexpress 85.2 is available as a conversion utility to convert existing cassette software to disc, but it is by no means foolproof. Most other methods used to backup cassette software to microdrive should apply to the Opus.

One glaring omission of Transexpress is the utility to go from disc to tape. Cassette tape remains a cost effective way of archiving material and I cannot believe this is an intended oversight.

Transexpress supplied with Opus Discovery 1 works well in transferring cassette-based programmes to disc with the limitation that the renaming of files by Transexpress is not useful when new file names do not match those in the Basic loader.

Most Spectrum software is constructed of a series of files loaded in sequence by a short Basic program at the beginning that loads and runs the rest. Transexpress renames in the subsequent files as modifications of the First. "First" is followed by "First 1" and then by "First 2" and so on. If the programmer had already named them "First", "Second" and "Third", then Opus will fail to load.

## Some conclusions

At \$995 it compares favourably with drives for other systems particularly as it includes a joystick port and a printer port. And 180Kb storage is "respectable".

SAVEing and LOADing 32Kb of CODE takes about 23 seconds each way. Microdrive is faster by the order of 3! But conversely, a CAT command takes less than two seconds on the OPUS, but can be up to 10 seconds on a Microdrive.

The review unit was loaned by the importers, Microware Ltd, Wellington, who added the following comments:

The time taken to load and save programs on the Discovery unit may well be slower than the microdrive in some cases. The microdrive does have a slightly faster transfer rate. Where the Discovery wins is in the loading of a program that consists of several blocks of code. This is very quick, whereas the microdrive may have to loop completely prior to picking up each block.

Other points to note are the unit fits the SAGA keyboard; the 28 Pin socket inside the unit is for a 2K RAM chip, as part of the 2nd drive upgrade.

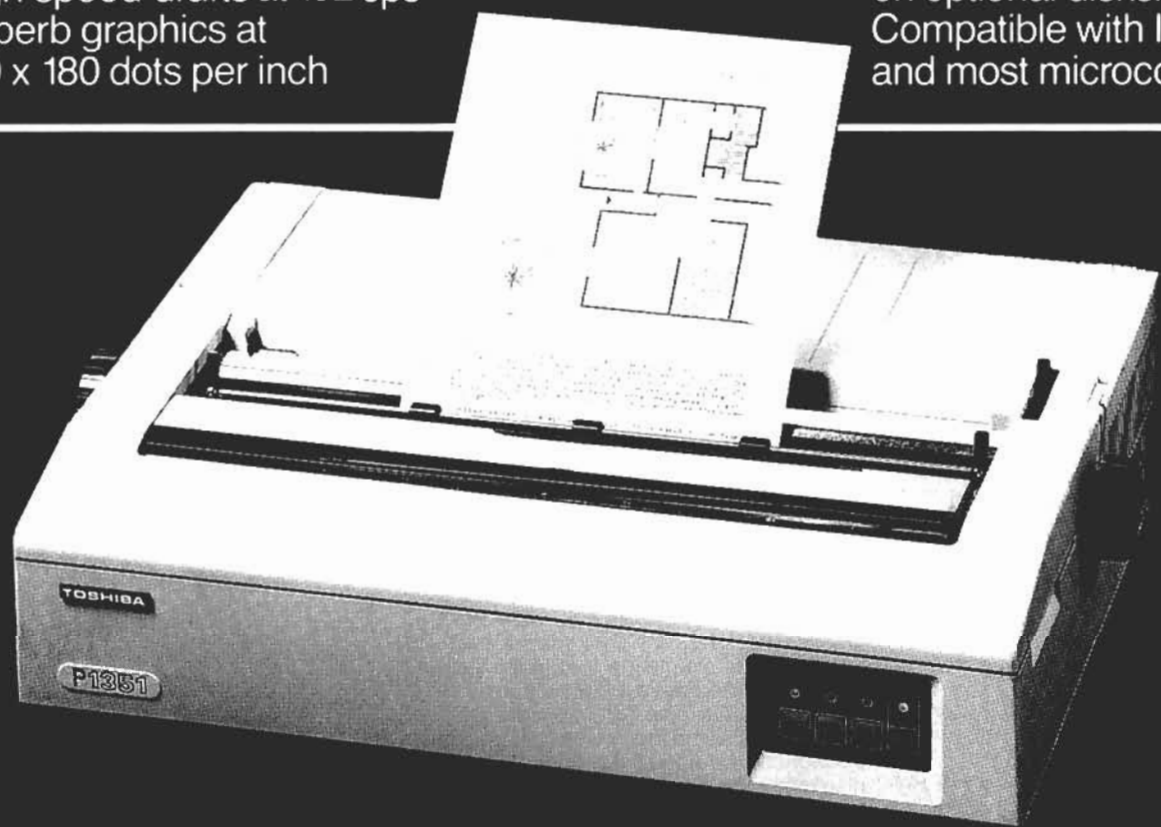
# TOSHIBA

# P1351

## Three-In-One Printer

- Letter quality at 100 cps
- High-speed drafts at 192 cps
- Superb graphics at 180 x 180 dots per inch

Variety of fonts available on optional disks. Compatible with IBM-PC™ and most microcomputers.



For more information contact:

**PAXUS**  
COMMERCIAL  
SYSTEMS



incorporating  
**SOUTHMARK ELECTRONICS LTD**

2 Ngaire Ave. Newmarket Auckland  
P.O. Box 6330 Auckland  
Phone 504609

TCC 0124

# Filling the gaps

By Gordon Findlay

*Last time we started work on a program which kept lists of names, addresses and telephone numbers. As the story ended we had a complete program, which presented a menu, of which only the clear and exit options actually did anything! Now its time to fill in some of the gaps.*

As we left the program, we knew it worked. As we write the missing sub-routines we should try to keep things that way!

The routines to load and save from tape (or disk), enter data from the keyboard, delete records, change record, search for a record, and alter a record all need to be written. What order should we do them in?

I think it is obvious that the first one should be the routine (at line 4000) which accepts data from the keyboard. This would then allow us to enter test data to debug the other modules as they are written.

After that I would have liked to write the routines at lines 2000 and 3000 which load and save from tape, so I could enter a file, save it and use it as the other routines are written. This way I would have a file of data to use without having to type names in every time I tested some modification (but the requirements of producing a magazine article preclude this).

Every machine has different commands for loading and saving, so I need to leave them for last.

This is quite important — don't write a program in the order it occurs to you — write it in the way which makes it easiest to develop. Too often I've seen programmers start by investing great amounts of energy into a title page, and getting a magnificent display, but never getting the program finished. Findlay's 56th law: "make it work before you make it pretty".

The entry routine is straight forward enough. In lines 4000 we clear the screen (change the command if you have to), and indicate how many records there are in the file already. This is helpful — it allows the user to keep track as data is typed. We read a name, address and telephone number, using the input statement in line 32.

This little subroutine (lines 30-34) first clears X\$, then inputs X\$!

Why? Some versions of BASIC won't change the value of a variable if the operator just presses RETURN as the reply to an input. Try this test:

```
10 X$ = "BITS AND BYTES"
20 INPUT X$
30 PRINT X$
```

At the input statement just press the RETURN key without anything else. Does "BITS AND BYTES" get printed? If so, your version of BASIC has the quirk I'm describing.

So the subroutine at line 30 is sure to return with an empty string if nothing is given.

## Why empty?

Why do we want an empty string?

At line 4040 we ask for a name. If the "name" typed in is null, we give up, and return to the main menu (line 4050), otherwise we increase the number of records (N) and store the reply as the next entry in the array of names (N\$(N)).

We then get an address and telephone number in the same way (line 4080-4105), but this time accepting a null entry as valid — after all, the member might not be on the phone, or we might not know the address.

Before accepting an entry as final we ask for confirmation that it is correct (line 4120) and use the subroutine for yes/no answers at line 20.

If the entry is not correct it is only necessary to back up the number of records, N, as in line 4140.

The incorrect name and address etc. will still be in the array, but we will never look past the value of N to see them.

The entry subroutine repeats until an empty name is given as a signal to quit. This subroutine could be worked on —



at present it won't allow "CHRIST-CHURCH, 4" as an address because of the comma.

A single key entry routine at line 20 would speed up the handling of yes/no answers.

The next routine should logically be the listing of data, so we can check that the data is recorded properly. I decided to allow the user to specify the first and last record to be listed.

Line 8005 will toss us out if there is no data to list, otherwise we give a first and last record number. These are captured as strings so that a null response can be taken as a "default value".

If the starting value is null, or less than 1, it becomes 1; if the finishing value is greater than N, or null, it becomes N. This means that the user can just press RETURN if the data is at one end or the other of the file. Pressing RETURN twice lists the whole lot.

A subroutine to display a record looks to have several application — lines 40 to 46 will do the trick. They print whichever record is chosen, as given by the value of the variable 1.

The rest of the listing subroutine is a simple loop, pausing between records to let the user have a look at the screen.

Deleting a record can be dangerous. Lets check that the right record is deleted. This can be done by deleting only one at a time, returning to the main menu each time; and by displaying the record to be deleted before doing anything.

Line 5032 checks that the record number that is given is a valid one — always check inputs!

The subroutine to display a record is used (that's why the record number was stored as 1) and the subroutine to get a yes/no answer used to confirm. As you can see, once we get some way into the program we will find bits of program ready for us to catch up and use.

(Continued on page 28)

## VALUE FOR MONEY

If that's what you're after (and who isn't?), then call us — ANYTIME! (24hr phone)  
We only stock those computers which offer you the best value your dollars can buy,  
backed up by many years of experience in this specialised market.

OUR RANGE CURRENTLY INCLUDES:

AMSTRAD

ATARI

CAT

CORONA

# KANE AGENCIES LTD

304A HARDY ST.  
Ph (054) 84-066  
P.O. BOX 710 NELSON

Orders supplied nationwide — FREIGHT FREE. Visa, Bankcard Accepted.

(Continued from page 27)

## 'Decrementation'

Deleting a record means doing two things — changing the record number, N, and moving all records after the deleted one back one space. To explain: if the seventh record out of ten is deleted, the 8th moves into 7th place; the ninth into 8th place, and the tenth into ninth place. No more seventh, but two copies of the tenth!

By decreasing N by 1 ("decrementing" N) though, we will ensure that we never look past 9th place, and therefore never see the duplicate.

One minor complication — if the last record is deleted we have no moving back to take care of, so in line 5075 we skip around.

Changing a record could be as complex, or as simple, as you like. This is the place where most expansion and refinement is possible. I'm working on a large-ish program just now in which changing of records is done by using cursor motion keys, with a screen-based editor, rather like a word processor.

However, there is no room here for such large codes so a rudimentary version will have to do.

We change a record by displaying it, (line 6030), and asking for new name, address and phone. If nothing is given (X\$ is empty) then the field concerned is left alone, and no substitution made (for example, in line 6070, where the address is only changed if a new one is given).

Users make mistakes, so the amended record is shown and they are asked to say whether it is now correct — if not, they can try again.

The routines are relatively simple, but all rely on the user knowing the number of the record to delete or change. This can be found by listing the data and looking for the one wanted, or by using the search option, so the computer does the work.

That, and some information about loading and saving, will have to wait for next episode. In the meantime, add these routines to last month's shell, and *test them thoroughly*. Then knock the rough edges off — I've left plenty for you!

Additions to last month's program.

```
Input a string, possibly null
30 X$="" :REM see text
32 INPUT X$
34 RETURN
```

```
Display record number I
40 PRINT "Name: "; N$(I)
42 PRINT "Address: "; A$(I)
44 PRINT "Phone: "; PH$(I)
46 RETURN
```

```
Capture data from keyboard
4000 CLS:REM clear screen.
4010 PRINT "There are "; N; " records
in the file"
4020 PRINT "Enter new records: give a
blank name to stop entering."
4030 PRINT:PRINT :REM give a bit of
room
```

```
4040 PRINT "Name: "; :GOSUB 30
4050 IF X$="" THEN RETURN
4060 N=N+1
4070 N$(N) = X$
4080 PRINT "Address: "; :GOSUB 30
4090 A$(N) = X$
4100 PRINT "Phone: "; :GOSUB 30
4105 PH$(N) = X$
4110 PRINT:PRINT
4120 PRINT "Is this entry correct
(Y/N)";
4130 GOSUB 20
4140 IF X$ = "N" THEN N = N - 1
4150 GOTO 4000
```

Delete a record

```
5000 CLS
5010 PRINT "Delete a record!"
5020 PRINT:PRINT
5030 INPUT "Which record should be
deleted (number)"; I
5032 IF I < 0 OR I > N THEN PRINT "There
is no such record":RETURN
5040 GOSUB 40 :REM display the ith
record
5050 PRINT:PRINT "Delete THIS record
(Y/N)";
5060 GOSUB 20
5070 IF X$="N" THEN RETURN
5075 IF I = N THEN GOTO 5130
5080 FOR J = I + 1 TO N
5090 N$(J-1) = N$(J)
5100 A$(J-1) = A$(J)
5110 PH$(J-1) = PH$(J)
5120 NEXT
5130 N = N - 1
5140 RETURN
```

Change (edit) a record

```
6000 CLS
6010 PRINT "Change which record";
6015 INPUT I
6020 IF I < 0 OR I > N THEN PRINT "no
such record!":RETURN
6030 GOSUB 40
6040 PRINT:PRINT
```

```
6050 PRINT "New name: ";
6060 GOSUB 30
6070 IF X$ <> "" THEN N$(I) = X$
6080 PRINT "New Address: ";
6090 GOSUB 30
6100 IF X$ <> "" THEN A$(I) = X$
6110 PRINT "New phone: ";
6120 GOSUB 30
6130 IF X$ <> "" THEN PH$(I) = X$
6140 CLS
6150 PRINT "New record "; I
6160 PRINT:PRINT
6170 GOSUB 40
6180 PRINT:PRINT
6190 PRINT "Is this correct now (Y/N)";
6200 GOSUB 20
6210 IF X$ = "N" THEN GOTO 6050
6220 RETURN
```

List record(s) on screen

```
8000 CLS
8005 IF N=0 THEN PRINT "No data to
list! Press return":INPUT X$:RETURN
8010 PRINT "Start list at which record
(default = 1)";
8020 GOSUB 30
8030 ST = VAL(X$)
8040 IF ST < 1 THEN ST = 1
8045 IF ST > N THEN ST = 1
8050 PRINT
8060 PRINT "Finish listing at which
record (default = last)";
8070 GOSUB 30
8080 FI = VAL(X$)
8090 IF FI > N THEN FI = N
8100 IF FI = 0 THEN FI = N
8110 FOR I = ST TO FI
8120 CLS
8125 PRINT "Record number: "; I
8126 PRINT
8130 GOSUB 40
8140 PRINT:PRINT
8150 PRINT "Press return to continue..."
8160 INPUT X$
8170 NEXT I
8180 RETURN
```

## Commodore 64

### Supercade® Disk Software

#### DATA BLITZ

BACKUP DISK COPIES SUPER FAST WITH A SINGLE DRIVE. READ AND WRITE DISK ERRORS SO YOU CAN COPY MOST PROTECTED DISKS. FOR PERSONAL USE ONLY.

**\$79.95**

#### SUPER UTILITIES

USE TURBO LOAD SO THAT MOST COMMERCIAL AND YOUR OWN PROGRAMS WILL LOAD 300% FASTER. AUTO-LOAD AND RUN YOUR OWN PROGRAMS. AUTO NUMBER. DELETE. RENUMBER. MERGE. FIND. TRACE. SPEEDUP. ANALYZE. UNNEW. UNSCRATCH. COPY FILES. SUPER CRUNCH. DISK MERGE. DATA CRUNCH AND MANY MORE.

**\$29.95**

#### STRIP POKER II

SENSUOUS GAME THAT IS A CHALLENGING EXPERIENCE WITH BREATHTAKING OVERTONES IN VIDEO FANTASY AND COMPUTER PSYCHOMETRY. FAST AND FANTASTIC!

**\$59.95**

#### JOYPEN

A HIGH RESOLUTION DRAWING SYSTEM THAT IS ONE OF THE MOST POWERFUL AVAILABLE.

**\$59.95**

NOTE: JOYPEN REQUIRES THE SIMON'S BASIC CARTRIDGE WHICH IS NOT INCLUDED

#### ASTEROID ATTACK

LASER CANNONS ARE YOUR BEST DEFENCE IN THIS FAST SPACE GAME.

**\$19.95**

SEND YOUR ORDER TO

**DATA STREAM®**  
P.O. BOX 87 NAPIER

Please include  
\$3.00 for post and  
packaging  
All enquiries: Phone 57766 Napier

## Part Two: AL programming with CP/M

## Running Assembly Language

By Neil Williamson,

of NZ Osborne Users Group

This program prints all the printable characters between 20 hex (a space) and 7f hex (rubout) continuously on the screen until a key is pressed.

The program processes one Byte at a time, and prints one character at a time. However, since it works at machine speed, it appears as though everything happens virtually instantaneously.

The program is entered using DDT.COM. Load DDT.COM and when the — prompt shows type A100 [RETURN]. You should now see the hex address 0100.

The A command allows you to enter Assembly Language instructions at the address shown.

Type the following instructions opposite the addresses shown, with a [RETURN] after each line. If you make a mistake on a line and want to go back and correct it, simply press [RETURN] opposite an 'empty' address to get back to the — prompt, then type A followed by the address where you wish to make alterations.

| Address | Instruction |
|---------|-------------|
| 0100    | MVI E,20    |
| 0102    | MVI C,2     |
| 0104    | PUSH D      |
| 0105    | CALL 5      |
| 0108    | POP D       |
| 0109    | INR E       |
| 010A    | MOV A,E     |
| 010B    | CPI 7F      |
| 019D    | JNZ 102     |
| 0110    | MVI C,B     |
| 0112    | CALL 5      |
| 0115    | ORA A       |
| 0116    | JZ 100      |
| 0119    | RST 7       |

After inputting the above program, hit [RETURN] on the line following 0119. This will get you back to the DDT — prompt.

Then type either CTRL C or GO [ie Gzero] [RETURN] to perform a warm boot and get you back to the A) prompt.

Then type SAVE 1 BARBER.DDT[RETURN].

This instruction saves 1 CP/M page (100 hex or 256 decimal Bytes) of memory starting at 100 hex, into a file called "BARBER.DDT".

To run the saved program, type DDT BARBER.DDT[RETURN]. This will load DDT then your program. You should see the following:

```
DDT VERS 2.2
NEXT PC
0200 0100
```

Finally, type G100[RETURN]. The

program should then run outputting characters to the screen continuously until you hit a key.

The way the program works is that the first character, a space (20 hex), is put into the E register, and the console output call is put into the C register. The content of the E register is saved in the stack by the PUSH instruction, and then printed on the screen by the call to 0005 hex (BDOS).

The content of the E register is restored by the POP instruction, increased by one, duplicated into the A register, and then tested to see if it is 7F hex. If not, it is saved and printed, and the program loops to print the next character.

If it is 7F hex, the program tests to see if a key has been pressed to end the program. If not, the program repeats starting at memory location 0100; otherwise, it ends.

The Assembly Language instructions used in the above program are as follows:

**MVI** (for Move Immediate) means "Move immediately the Byte shown after the stated register into that register". This instruction moves (or puts) the hex value of 20 into the E register, preparatory to printing the ASCII character with that value.

The equivalent of this instruction in Basic is the LET instruction - eg LET E=&H20

On the next line, the hex value 2 is moved into the C register. The hex value 2 is the CP/M call for Console Output, that is, print on the screen.

**PUSH** means "Save the contents of the stated register pair in the stack". The register pairs are B (for B-C), D (for D-E), H (for H-L), and PSW (for A-PSW).

The D-E pair is saved in this program as the value in the E register is used by later instructions, and use of BDOS trashes the contents of the registers.

**CALL** means "Call the subroutine stated". Its equivalent in BASIC is the GOSUB instruction. In this case, BDOS is called to print the character in the E register on the screen.

**POP** means "Restore the stated register pair from the stack". This gets back the value in the E register.

**INR** (for Increase Register) means "Increase the contents of the stated register by 1". In the program, the value in the E register is increased.

**MOV** (for MOVE) in this case means "Move the Byte in the second register stated into the first register stated". So MOV A,E will move the contents of the E register into the A register.

The contents of the second register

remain unchanged. The equivalent of this instruction in BASIC is LET AE.

**CPI** (for Compare Immediate) means "Compare the Byte in the accumulator with the hex number immediately following the instruction". The CPI instruction acts as if the hex number is subtracted from the number in the accumulator and sets the zero flag to bit 1 if the result of the subtraction is zero — that is, the two numbers are the same — or bit 0 if a non-zero result.

The CPI instruction is used to test to see if one number equals another or not, and CPI 7F sets the zero flag if the Byte in the accumulator equals 7F hex. The program is designed to print only the characters up to 7F hex.

**JNZ** (for Jump if Not Zero) means "Jump to the address shown if the zero flag has not been set". The CPI instruction may have set the zero flag depending on the value in the accumulator.

The two instructions act as a branch in the program similar to the IF instruction in BASIC. The BASIC equivalent is IF A<>&H7F THEN 102

**MVI C,B** moves the Check Console Status call (OB hex) into the C register. This CP/M call, when BDOS is called, puts into the Accumulator 00 hex if no key is pressed, or FF hex if one has been pressed.

**ORA** (for OR Accumulator) means "Logically OR the accumulator with the stated register". ORA A will OR the accumulator with itself. The instruction will set the zero flag if there is 00h in the accumulator, thus indicating no key has been pressed.

**JZ** (for Jump on Zero) means "Jump to the address shown if the zero flag has been set". This sequence of instructions allows the user to stop the program by pressing a key.

**RST 7** (for Restart) means "Restart DDT".

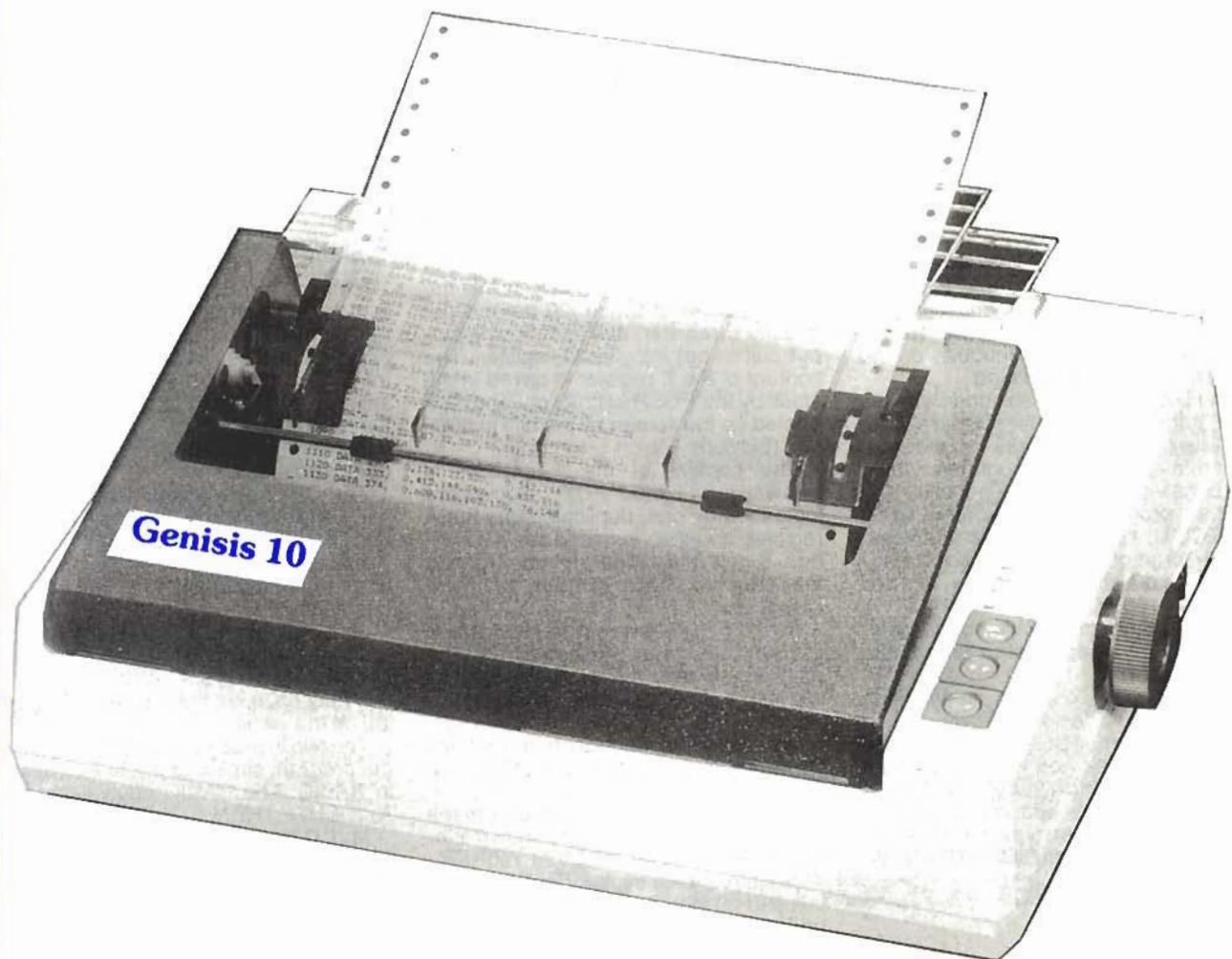
An article of this size can only be a brief introduction to working with Assembly Language. Only a few of the 8080 instructions have been explained.

To find out more, I recommend a book called "SOUL OF CP/M" by Mitchell Waite and Robert Lafore (Howard W. Sams & Co Inc.).

This book is an excellent "hands on" introduction to Assembly Language programming and the CP/M operating system.

The Assembly Language program above is one of the many sample programs in the book to help you learn Assembly Language programming, and the CP/M system calls.

Part 1 was in the October issue.



## A rose by any other name...

Genisis Systems would like to re-introduce you to an old friend. And it still smells as sweet, prints as fast and is as ruggedly reliable as it ever was.

And you won't believe the price.

# \$695

*Clip and mail coupon today*

**Yes, I would like more information on the Genisis 10. Please send me the name of the nearest 10 dealer.**

**Name** .....

**Address** .....

.....

**Phone** .....

**This really is the printer with the mostest for the leastest!**

*CHECK IT OUT - YOU WON'T BE SORRY*

Distributed by:

***Genisis Systems Ltd.***

**star** printer distributors for N.Z.

47 Station Road, Otahuhu, Auckland, New Zealand  
P.O. Box 6255, Auckland 1, New Zealand  
Phone 27-67349 Telex 2814 (Rocket)

# 8-bit and beyond...

By Joe Colquitt

Most 6502 machines will run these routines as long as absolute addresses are taken into account.

Last time some simple arithmetic was explained, and to carry on, here are routines to use in multiple byte calculations. The first example is to total eight numbers stored in consecutive bytes, and store the product in two other bytes.

The 8 numbers are stored in \$C080-\$C087, the low byte of the product ends up in \$C100, and the high in \$C101.

Note that by using different parameters for the X register, up to 256 consecutive bytes can be added together. See program 1.

By using 'sec' and 'dec (high)', the routine can be used for multiple subtractions.

Multiplication over several bytes needs a different approach.

Here is the code for a routine to multiply two numbers, each up to 255, giving a maximum product of 65025, enough for most applications. The process used is the 'shift/add' algorithm.

Each time a 1 is shifted out of the multiplier, the multiplicand is added to the product.

Before using the routine, get the multiplier in \$C101 and multipland in \$C100.

The result is in \$C102 and \$C103. Execution time is between 170 and 250 clock cycles, (170-250 microseconds). See program 2.

To see this more graphically, the bytes can be examined as the routine

| Shift no. | Mult/R   | Mult/D   | ProdHi   | ProdLo   |                   |
|-----------|----------|----------|----------|----------|-------------------|
|           | 200      | 150      |          |          |                   |
|           | 11001000 | 10010110 | 00000000 | 00000000 |                   |
| 1         | 10010000 |          | 00000000 | 10010110 | add 150 to ProdLo |
| 2         | 00100000 |          | 00000001 | 00101100 | add 150           |
|           |          |          | 00000001 | 11000010 |                   |
| 3         | 01000000 |          | 00000011 | 10000100 |                   |
| 4         | 10000000 |          | 00000111 | 00001000 |                   |
| 5         | 00000000 |          | 00001110 | 10100110 | add 150           |
|           |          |          | 00001110 | 01100110 |                   |
| 6         | 00000000 |          | 00011101 | 01001100 |                   |
| 7         | 00000000 |          | 00111010 | 10011000 |                   |
| 8         | 00000000 |          | 01110101 | 00110000 |                   |

progresses. Take  $200 \times 150 (=30000)$  as an example:

The transfer of Bit7 of prodlo to bit0 of prodhi is accomplished by the fact that 'rol' rotates bits through the carry flag. So if bit7 of prodlo is a 1, and the rol picks this up and puts a 1 into bit0 of prodhi.

In the above calculation, 117 (01110101) is in prodhi, and 48 (00110000) is in prodlo.  $(117 \times 256) + 48 = 30000$ .

The process for division is similar. Successive subtractions are made until only a remainder is left. See program 3.

The parameters for this routine are: \$C100/\$C101 dividend lo/hi, \$C102 divisor, \$C103 quotient, \$C104 remainder. Eg divided 10134 by 47. See program 5.

Readers may like to tabulate a binary flow for a division.

32-bit multiplication is simply shifting 4 bytes instead of 2. See programs 4/6.

Anyone who would like a copy of the public domain monitor 'Supermon' for the C-64 should send me a cassette or disk and a stamped return envelope as I have an adjustable datasette. If you include a save on your tape, I can make sure my saves will load on your machine.

Joe Colquitt, 6 Martin Ave, Mt Albert, Auckland.

```

PROGRAM 1
C080 LDA#0000    ;CLEAR PRODUCT AREA
C081 STA#C080
C082 STA#C081
C083 TAX         ;SET INDEX
C084 LD#C080     ;LOAD LOW BYTE OF PRODUCT
C085 JSR#C084   ;PERFORM ADDITION
C086 CP#C080    ;TEST FOR -9 ADDITION
C087 BNE#C080   ;LOOP IF LESS
C088 ROL#C080   ;RETURN TO INITIAL CALL

;ROUTINE
C089 CLC
C090 LDA#C080   ;LOAD THE NEXT BYTE TO THE ACCUMULATOR
C091 STA#C080   ;STORE THE LOW BYTE OF RESULT
C092 BCC#C080  ;IF CARRY IS NOT SET DON'T INCREASE THE HIGH BYTE
C093 INC#C081   ;INCREMENT THE COUNTER
C094 RTS       ;RETURN TO MAIN

PROGRAM 2
C0A0 LDA#0000    ;CLEAR THE PRODUCT AREA IN RAM C100
C0A1 STA#C100
C0A2 STA#C101
C0A3 TAX         ;SET THE COUNTER
C0A4 ROL#C100   ;SHIFT PRODUCT LEFT (HIGH)
C0A5 ROL#C101   ;SHIFT MULTIPLIER (HIGH)
C0A6 BCC#C101  ;NO ADDITION IF TEST BIT IS 0
C0A7 CLC        ;CARRY CLEAR TO ADD TO PRODUCT
C0A8 LDA#C100
C0A9 STA#C102
C0AA INC#C101  ;INCREMENT THE PRODUCT HIGH BYTE IF NECESSARY
C0AB DEC#C103 ;DECREASE THE COUNTER AND LOOP IF --
C0AC BNE#C0A7  ;DECREASE THE COUNTER AND LOOP IF --
C0AD STA#C102 ;STORE THE PRODUCT LOW BYTE
C0AE RTS

PROGRAM 3
C0B0 LDA#0000
C0B1 STA#C100
C0B2 STA#C101
C0B3 LDA#C101
C0B4 STA#C102
C0B5 ROL#C102
C0B6 ROL#C103
C0B7 ROL#C104
C0B8 ROL#C105
C0B9 ROL#C106
C0BA ROL#C107
C0BB ROL#C108
C0BC ROL#C109
C0BD ROL#C10A
C0BE ROL#C10B
C0BF ROL#C10C
C0C0 CLC
C0C1 LDA#C107
C0C2 ADC#C10A
C0C3 STA#C10A
C0C4 STA#C10B
C0C5 LDA#C10C
C0C6 ADC#C107
C0C7 STA#C107
C0C8 DEC#C108
C0C9 BNE#C0C4
C0CA RTS

PROGRAM 4
C0D0 LDA#0000
C0D1 STA#C100
C0D2 STA#C101
C0D3 STA#C102
C0D4 STA#C103
C0D5 CLC
C0D6 LDA#C107
C0D7 ROR#C10A
C0D8 ROR#C10B
C0D9 ROR#C10C
C0DA ROR#C10D
C0DB ROR#C10E
C0DC ROR#C10F
C0DD ROR#C110
C0DE ROR#C111
C0DF ROR#C112
C0E0 ROR#C113
C0E1 ROR#C114
C0E2 ROR#C115
C0E3 ROR#C116
C0E4 ROR#C117
C0E5 ROR#C118
C0E6 ROR#C119
C0E7 ROR#C11A
C0E8 ROR#C11B
C0E9 ROR#C11C
C0EA ROR#C11D
C0EB ROR#C11E
C0EC ROR#C11F
C0ED ROR#C120
C0EE ROR#C121
C0EF ROR#C122
C0F0 ROR#C123
C0F1 ROR#C124
C0F2 ROR#C125
C0F3 ROR#C126
C0F4 ROR#C127
C0F5 ROR#C128
C0F6 ROR#C129
C0F7 ROR#C12A
C0F8 ROR#C12B
C0F9 ROR#C12C
C0FA ROR#C12D
C0FB ROR#C12E
C0FC ROR#C12F
C0FD ROR#C130
C0FE ROR#C131
C0FF ROR#C132

```

## OPUS DISCOVERY 1

**COMPLETE  
ALL-IN-ONE  
DISC DRIVE  
SYSTEM FOR  
THE ZX  
SPECTRUM**



FEATURING:-

- 3.5 inch Disc drive unit 180K (plus room for 2nd drive).
- Peripheral through connector.
- Joystick interface (Kempston compatible).
- Parallel printer port.
- Video monitor output.
- RAM disc facility.
- Microdrive syntax.
- On-board power supply (also powers Spectrum).
- Free blank 3.5 in disc.
- Free Trans Express tape copier and utilities disc.

**NOW ONLY  
\$895.00**

Write for details to:-

**MICROWARE (N.Z.)  
P.O. BOX 6309  
WELLINGTON  
Ph. (04) 675-182**

# HALF PRICE SOFTWARE SALE

## WHILE STOCKS LAST

### COMMODORE 64

|  |  |  |
|--|--|--|
| <b>V64-1961 STAR TREK (CT) \$35.00</b><br>You command the fate of the U.S.S. Enterprise.   | <b>V64-4102 BREAK FEVER (C) \$10.00</b><br>Using your joystick you too can experience the fun of Break dancing at a top break dancing competition. On the reverse side a specially mixed audio version of the music which can be played through your normal audio system.                              | <b>V64-4206 SENTINEL (C) \$15.00</b><br>You're in command of a starship with the latest in ultra-sophisticated computerised instrumentation. The fate of the planet is in your hands!  |
| <b>V64-1962 BUCK ROGERS (CT) \$35.00</b><br>You are Buck Rogers fighting the Battle of Planet Zoom. Skilfully slip through zapping electron hoppers and alien saucers.   | <b>V64-4103 TROLLIE WALLIE (C) \$10.00</b><br>This is about one of Wallie's shopping sprees. This is a graphical wonderland.   | <b>V64-4207 POLE POSITION (C) \$15.00</b><br>You are in the driver's seat on a Grand Prix track. You can either race the first lap against the clock to try to achieve the Pole Position or you can race eight other cars on your choice of four circuits! |
| <b>V64-1963 CONGO BONGO (CT) \$35.00</b><br>You're on a jungle safari packed full of wild and zany adventures, all the while trying to keep clear of the wild animals.   | <b>V64-4104 GUZZLER (C) \$10.00</b><br>Indulge your guzzling fantasies and eat as much as you like! All you need to do to get thin is to be hit by Deflator Dennis! Can you avoid the Frobbles while also catching Bonus Barrie?   | <b>V64-1960 TAPPER (CT) \$35.00</b><br>You're serving drinks in some of the craziest places you've ever seen! And the service better be good or else!  |
| <b>V64-2001 EVOLUTION (D) \$25.00</b><br>You start off as an amoeba, but watch out for the antibodies. If you survive, eventually you become a human saving the world from mutant aliens.                                      | <b>V64-4105 WHERE'S MY BONES? (C) \$10.00</b><br>This must surely be the best scrolling game yet seen. Can you help Brother Jeffery find all the bones of his skeleton so he can be accorded a decent burial!  | <b>V64-5001 CAESARS TRAVELS (C) \$15.00</b><br>A marvellous animated collection of stories about the travels of Caesar the Cat while he is looking for a new home. This is accompanied by a bedtime story book and a keyboard overlay.                     |
| <b>V64-2043 ZORK 1 (D) \$25.00</b><br>Enter the mind frazzling world of ZORK.  | <b>V64-4106 HEROES OF KARN (C) \$10.00</b><br>A popular graphical adventure game which uses 'Real English'! You are battling the powers of Night while trying to release the Heroes of Karn from their incarceration.  | <b>V64-5002 FIRST STEPS WITH MR MEN (C) \$15.00</b><br>Four programs featuring simple and rewarding games to help develop skills young children need when starting to read. Colourful book and key overlay included.                                       |
| <b>V64-2080 FLIGHT SIMULATOR 11 (sublogic) (D) \$65.00</b><br>Let Flight Simulator 11 put you at the controls of a modern single-engine aircraft with full flight instrumentation and colourfully realistic panoramic view.    | <b>V64-4201 RAID OVER MOSCOW (C) \$15.00</b><br>The Soviets launch a nuclear attack on the United States. The only hope to save the world is a space station equipped with stealth bombers. You must knock out the Soviet missile bases to destroy the Soviet Defence Centre!                          | <b>V64-5003 GO SPRITE (C) \$15.00</b><br>A versatile, easy-to-use sprite designer and tester. Simple animation of 32 sprites, easy handling, and lots more!  |
| <b>V64-4001 CHILLER (C) \$ 5.00</b><br>Your aim is to save your girlfriend who fled in terror into a House of the undead! Can you save her before the demons from Hell reach her?  | <b>V64-4202 BEACH HEAD (C) \$15.00</b><br>A peaceful island is being held by a ruthless dictator and his military troops. As Chief Commander of land and sea forces in the Pacific, you must obtain a quick naval victory and then invade the island!  | <b>V64-5004 GAMES CREATOR (C) \$15.00</b><br>A fast, easy-to-use program that lets you design, save and play your own games whenever you want. No programming languages needed as all prompts and commands are shown on screen in English.                 |
| <b>V64-4002 VEGAS JACKPOT (C) \$ 5.00</b><br>Try your luck at Las Vegas!   | <b>V64-4203 BRUCE LEE (C) \$15.00</b><br>You find yourself in Japan to discover the secret of eternal life. Determined to stop you are the Ninja and the nasty green giant, Yamo. You will need all of your agility, kicks and punches to defeat these foes. Luckily you can also leap, jump and duck! | <b>V64-8001 COLOURTONE MUSICAL KEYBOARD (D) \$50.00</b><br>A musical keyboard which plugs into your Commodore 64. Press down on the Harp Strip and you can play "no fault" music! No musical knowledge is required!  |
| <b>V64-4003 1985 - THE DAY AFTER (C) \$ 5.00</b><br>It is the Day After. Big brother has been destroyed. You have been assigned to find the energy your planet needs to survive. Can you find the power so the world can live? | <b>V64-4204 DALEY THOMPSON'S DECATHLON (C) \$15.00</b><br>Test your sports prowess! Could you be a champion?   | <b>V64-6010 MUSICALC 1 (D) \$35.00</b><br>Synthesizer and sequencer. A choice of 32 instruments and 32 backing songs. Comes complete with a beginners guide and users manual.  |
| <b>V64-4005 BMX RACERS (C) \$ 5.00</b><br>Race your BMX Bike around the track! With all the thrills and spills of BMX Racing.  | <b>V64-4205 INDIANA JONES (C) \$10.00</b><br>Follow the legendary hero through the hazards of his quest! How successful are you?   | <b>V64-6011 MUSICALC 2 (D) \$25.00</b><br>Using this and Musicalc 1's score files this will print your composition on the screen, or using the printer, on paper!  |
| <b>V64-4007 MAGIC CARPET (C) \$ 5.00</b><br>You are Alladin and on a quest of honour: to retrieve the treasure stolen from your family by the evil sultan Abdulla.   | <b>V64-4008 DARK STAR (C) \$ 5.00</b><br>You are a skyeagle of the Jupiton fleet on a suicide mission to destroy the Dark Star once and for all.   |  |
| <b>V64-4009 BIG MAC-MAINTENANCE MAN (C) \$ 5.00</b><br>The mission for Agent 007 3/4, Code Name Big Mac, is to shut down the enemy power station!  |  |  |
| <b>V64-4101 ARABIAN NIGHTS (C) \$10.00</b><br>Tales of the Arabian Nights - one of the first games to be released with 'speech' without the use of hardware. A lot of fun.   |  |  |



# HALF PRICE SOFTWARE SALE WHILE STOCKS LAST

COMMODORE 16

|   |  |  |
|---|--|--|
| <b>V64-6012 MUSICALC 3 (D) \$25.00</b><br>Gives you an additional 70 scales. This program can develop, transpose and edit new or existing keyboard scales.  | <b>V64-7002 EXPENSE MANAGER (C) \$15.00</b><br><b>V64-7012 EXPENSE MANAGER (D) \$20.00</b><br>The complete profit and loss manager for your household! Uses information produced with the budget program. Will produce graphical displays of income and expense categories                   | <b>V16-4002 VEGAS JACKPOT (C) \$ 5.00</b><br>Try your luck at Las Vegas! All the excitement of the casino.   |
| <b>V64-0033 MUSIC COMPOSER (CT) \$30.00</b><br>Absolutely no musical ability or computer background is required. Includes an easy to understand manual.   | <b>V64-7003 BUDGET (C) \$15.00</b><br><b>V64-7013 BUDGET (D) \$20.00</b><br>Plan your expenses and balance your Budget! You can create Budgets for up to five years ahead! compare figures with the Bank Manager and expense Manager programs and produce graphical displays                 | <b>V16-0151 INTRO TO PROGRAMMING (C) \$25.00</b><br>A fully comprehensive computing course.  |
| <b>V64-0200 EASY SCRIPT (D) \$60.00</b><br>One of the most powerful word processors on the market at any price. Features include: full horizontal and vertical tabbing; variable margins; underlining and bold print; search and replace; file linking; and all other standard word processing. | <b>V64-7004 DIARY (C) \$15.00</b><br><b>V64-7014 DIARY (D) \$20.00</b><br>Organise and plan your Social and Business calendar! This can be used over an eight year period. Will also print a monthly calendar with all dates marked and described.   | <b>V16-4220 AIR COMBAT EMULATOR (C) \$15.00</b><br>Your chance to feel the thrill of flying a jet fighter in high speed aerial combat.   |
| <b>V64-0201 EASY SPELL (D) \$50.00</b><br>A spelling checker for your Easy Script documents.  | <b>V64-7005 LETTER WRITER (C) \$15.00</b><br><b>V64-7015 LETTER WRITER (D) \$20.00</b><br>Turn your Commodore 64 into an electronic typewriter! Simple and easy to use with pictorial display of all commands and selections. Documents produced can be saved to either disk or cassette.    | <b>V16-4221 ESCAPE FROM PULSAR 7 (C) \$15.00</b><br>You are alone on a gigantic space-freighter! The rest of the crew have died horribly. Your only chance of escape is to reach the frail shuttlecraft. |
| <b>V64-0202 EASY MAIL (D) \$50.00</b><br>A fully featured name and address program. Provides for label printing; search and sort any field; and complete file maintenance.  | <b>V64-7006 BILL PAYER (C) \$15.00</b><br><b>V64-7016 BILL PAYER (D) \$20.00</b><br>This complete bill paying system lets you track your expenses month by month! You can enter due date, cheque number and date paid for each account. Produces, displays and prints summaries of all bills | <b>(CT) = Cartridge</b><br><b>(C) = Cassette</b><br><b>(D) = Disk</b>  |

|   |
|---|
| <b>V64-3050 CALC RESULT ADVANCED (D) \$180.00</b><br>3 dimensional, multipage spread sheet. |
|---|

|   |
|---|
| <b>V64-3055 CALC RESULT EASY (D) \$100.00</b><br>2 dimensional, single page spread sheet. |
|---|

|   |
|---|
| <b>V64-3060 SUPER BASE 64 \$125.00</b><br>Complete information control system links to other programs such as Easy Script. Easy to understand menus, the number of records is limited only by your equipment. |
|---|

|  |
|--|
| <b>V64-4216 THE MANAGER - DATABASE (D) \$65.00</b><br>Flexible, multi-purpose database lets you design your own computerized reports and files for home or business. Address files, mailing lists, project status, investments. 4 built-in applications, or design your own. |
|--|

|   |
|---|
| <b>V64-7001 BANK MANAGER (C) \$15.00</b><br><b>V64-7011 BANK MANAGER (D) \$20.00</b><br>Your personal cashbook system! Can be used with several different accounts at once. Full end of month Bank Reconciliation and error location routine. Can give you colourful graphic displays of income |
|---|

**RUSH ME**

| Product # | TITLE | PRICE |
|-----------|-------|-------|
|           |       |       |
|           |       |       |
|           |       |       |
|           |       |       |
|           |       |       |

**CHEQUE/MONEY ORDER FOR TOTAL \$**  
**ENCLOSED**

PLEASE CHARGE MY BANKCARD  VISACARD

CARD NUMBER

EXPIRY DATE ..... SIGNATURE.....

**SEND TO: SOFT SHOP ENTERPRISES LTD**  
**PO BOX 5029**  
**145 NELSON ST**  
**AUCKLAND**

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

PHONE \_\_\_\_\_

**PLEASE ALLOW FOURTEEN DAYS FOR DELIVERY** TCC 10010

# Adventure for students

From Colin Marshall

A teacher at Kohimarama Primary School, Auckland.

Is there a place in the classroom for computer adventures?

There is no denying the appeal of adventure games to computer users, but can this pastime be channelled into positive learning experiences.

For many years teachers have recognised the effectiveness of simulation-type lessons for their students — as in

acting out plays.

And similarly games manufacturers have realised the same appeal in involving game players in "realistic" situations. Monopoly is an example.

But can the simulation game loaded into a computer be of any educational value?

We can evaluate such games by analysing why simulations are so effective.

The answer appears to be that indi-

viduals enjoy making decisions about how their game will proceed, and good computer games are those which offer players this freedom of choice about the next move.

Generally they offer options involving exploration, and achieving tasks (like retrievals and rescues) with limited resources and time — and being "in charge" opens doors to imaginative thinking, and a logical process of inquiry.

Even the mundane encounters, such as with a piece of paper, take on real significance within the minds of players grasping for clues.

And in this regard we have a bridge to the educational use of adventure games.

Who said learning couldn't be fun? An educational computer simulation game would involve mapping skills, planning and executing logical (well...sometimes) sequences, and using basic skills like spelling and maths calculations.

This does not mean all adventure games are suited to positive classroom use and role playing: the dark and negative values of some games should be avoided.

But one that I recently ran for my classes is a good example of the potential in adventure games for encouraging worthy student responses.

Called Excalibur, it is published by the Fitzroy Community College in Australia and seems well suited to launching computer classes on this path.

This programme runs on a Commodore 64, costs \$40, and is one I would rate with four marks out of five.

Excalibur is for the person that wants to learn how to play an exciting adventure game without getting stuck in the first two minutes. Excalibur is not a programme that you take away to spend your entire vacation playing, but is a clear, concise and enjoyable introduction to adventure games.

It was produced in Australia by educationalists knowing how to make things simple without taking away the challenge. In my experience such programmes written for children have been the programmes that parents also pick up to learn with their children.

Excalibur is written in a way that focuses the player on the task rather than the language or the skills of playing. The results of this are important, and can be somewhat amusing.

Half an hour after starting play, a player realises a skilfulness without thinking about a skill-learning procedure.

Once past the simple instruction set, the screen is divided into two portions. The upper one shows a castle and four key features of the landscape in several colours. A bat flies across the screen and away you go.

The lower half of the screen is for text prompts and instructions. Full sen-



## Bondwell



### A complete system from only \$2495

DEPOSIT \$500 (\$25 WEEKLY)

**Free Software**

- Debtors • Stock Control • Invoicing
- Word Processing with Mail Merge
- Financial Planning Package • Database – filing system
- Speech Synthesiser

TOTAL VALUE \$3,400

**Check these features**

| Bondwell 12                                    | Bondwell 16  | Bondwell 14                                     |
|--|--|---|
| RAM 64K<br>DISK 400K<br>Fully portable<br>CP/M | RAM 128K<br>DISK 10,000K<br>Fully portable<br>CP/M | RAM 128K<br>DISK 800K<br>Fully portable<br>CP/M |

## SUPATECH ELECTRONICS

430 MT. EDEN ROAD PHONE 605-216 Late nights: Thursday & Friday  
OPEN ALL DAY SATURDAY

tences are accepted as well as one or two word prompts. Some commands, such as directions, can be entered as single letter commands.

One good feature is that commonly used words such as names can be accepted and understood if they contain slight spelling errors (though, of course, nobody ever makes these).

The objective is to obtain the sword Excalibur and return with it to your ship waiting in the harbour — or is it?

This sounds relatively easy until you discover your resource limitations: how much you can carry, your ability to overcome thieves, the health potion, and...why am I changing colour?

The hero (you) is a sprite for whom variations of play are explained as you go for a help function during in times of "stress".

Everything looks simple — except the job of completing your mission.

Errors are not easy to make. Neither I nor my pupils could make the programme bomb out — and that's saying something. The programme prompts you all the way along and checks what you are saying. If your answer is consistently wrong the computer gives you a prompt of options to choose from and one of these must be selected to progress.

Criticisms of this software are the slow loading time and the inability of graphics to totally show what the sprite character is doing. At stages the sprite has half a body behind the castle and half on the path — most unusual.

The price (\$40) is reasonable, though I believe this type of software should be in the \$20-\$30 range.

In conclusion, this is one piece of software that has not tried to bite off too big a chunk.

As an introduction to adventure games it is clear, concise and well written.

The graphics are not the world's best but the text is straight forward and useful.

The instructions and prompts are readily available and helpful.

## Chemistry experiments without a laboratory

Conducting sophisticated chemistry experiments without stepping into a laboratory is the role of MacChemistry, a unique computer software development that allows teachers, students and technicians to bypass physical laboratory experiments.

MacChemistry, from Southern Software Ltd in Auckland, enables the Macintosh user to stop, advance or go

back one or more stages of an experiment, at the press of a button. It features carefully delineated illustrations — from crystal lattices to quick-fit glassware. MacChemistry incorporates the benefits of quick reference to previous experiments, recall of experiments by stages, accurate graphic reporting and valuable build up of graduated information which can be stored, without tedious report writing.

# SEQUENTIAL MusicMate

MUSIC  
KEYBOARD  
FOR YOUR  
COMMODORE  
64 WITH  
DISK DRIVE  
**\$299**



The MUSICMATE is a quality musical instrument keyboard featuring full size keys like traditional instruments. And because it's designed for use with a powerful computer it lets you explore your music easily, and in exciting new ways. For instance you can select, modify and play many different instrument sounds. You can also record and playback any 3 voice arrangement you play on the MUSICMATE keyboard, up to 10 minutes at a time. And with the addition of other inexpensive software store your music on diskette or print your music in standard music notation. Your musicmate doesn't tie up your computer's expansion, just plug it into the Commodore 64 Joystick Port.

The MUSICMATE is well supported with optional software called Musicware, and priced at just \$79.95 each, Song Builder, Song Editor, Song Printer, Sound Maker.

PLEASE SEND FURTHER INFORMATION ON MUSIC MATE

NAME .....

ADDRESS .....

POST  
TO:

**TEKRAM AGENCIES LTD.**  
P.O. BOX 14040 CHRISTCHURCH  
TELEPHONE (03) 585-917, (03) 583-685



**COMPUTERS  
FOR PEOPLE**



**SANYO MBC**  
**SALES AND SUPPORT**  
35 Taranaki St, Wellington  
Phone 847-668, 859-675  
69a Rutherford St, Lower Hutt  
Phone 664-069

# Bits & Bytes Top Magazine!

We knew it was good...but we were elated: Bits & Bytes has the top readership of any New Zealand computer publication. We have —**96,000 readers**— that's one in 28 New Zealanders over the age of 10.

We ran a contest for marketing managers and media buyers throughout the computer industry and advertising agencies in New Zealand to guess our readership and only four people were in the running for our trip for two to Club Rarotongan.

The winner, pictured here getting into the spirit of things, was Tony Butler, manager of Fountain Marketing Ltd's Computer and Games Division. Other facts that came to light in the AGB McNair readership survey just released include:

- **60,000 readers are over the age of 20**
- **20,000 professional/government/management/executive**
- **7,000 self employed**
- **9,000 Teacher/nurse/police**
- **12,000 technical and skilled**
- **30,000 students**
- **80,000 readers in the top three socio economic groups**
- **17,000 readers with purchasing power over \$10,000.**

What does it all mean? It means Bits & Bytes is New Zealand's top selling and most read computer publication and that it is a magazine which relates to New Zealanders across the board.



## **An important reminder**

### **BITS & BYTES**

are running their

### **ANNUAL HARDWARE REVIEW**

in the December 85  
and January 86 issues

*Have you filled in  
and returned your  
questionnaire yet?*  
Please send your  
completed form to  
G.A. FINDLAY  
87 Somerfield Street  
CHRISTCHURCH 2.  
as soon as possible  
please

## **Christchurch Computer Show South Island Showcase**

The stage is set for the third annual Christchurch Computer Show which looks like being the largest yet held in the South Island with more than 40 exhibitors, representing the country's major hardware and software distributors.

The seminars, which have become a feature of these shows, have already attracted heavy bookings and the organisers believe these will be booked to capacity by the time the three day event opens on November 22nd.

The Christchurch Computer Show was the first in the Bits and Bytes series of shows and it has become something of an annual event for dealers and consumers throughout the South Island,

many making a point to travel from the deep South, the West coast or the Nelson area to familiarise themselves with new product available in this rapidly changing field.

The high interest in videotex is likely to attract many potential subscribers: it will be the first time that Computex is displayed publicly at such an event.

The drop in prices at the low end range of the market has also revived interest amongst would-be purchasers, especially those who earlier felt themselves priced out of the market.

All visitors to the show will go in the draw for an Apple 11 e Professional System from Andas Computer Centres.

# If you suffer from chronic disorganisationitus...



**Y**ou know the symptoms of disorganisationitus. Your time is at a premium, but you're continually interrupted. Your workload increases but you've only outdated tools to cope with it. There's a queue for office equipment like the telex, filing systems, the mailroom, typewriter and word processing. Your cluttered desk full of paper, gadgets and spaghetti wiring undermines your efficiency.

You've heard all about pc's and computer terminals, but you haven't got the time to learn their complicated computer codes and jargon. Well, now we can offer you a cure — all in one solution.

**COMPUTERPHONE.** In one small piece of desktop equipment, it's the all in one solution to your problems. The first truly integrated personal workstation. **COMPUTERPHONE** combines the most useful features of AN ADVANCED TELEPHONE with a built-in answering service and telephone directory. A PERSONAL COMPUTER, with

## ...here's the cure — all in one solution.



Telecom  
**Computerphone**

spreadsheet, file management, graphics and word processing. A **VIDEOTEX AND COMPUTER TERMINAL** for access to databases and mainframes. A **CALCULATOR** with memory and scroll facilities. An **ELECTRONIC MESSAGING TERMINAL** for desk-to-desk and

person-to-person messaging nationwide and around the world. All in one space saving unit. It's versatile, easy to use and instantly usable. And it works the way you do — moving simply and quickly from one task to another, and back again. Don't let these features confuse you. **COMPUTERPHONE** is the essence of simplicity. It plugs into a standard telephone and power socket and is as simple to use as a phone.

If you suffer from disorganisationitus, **COMPUTERPHONE** is the cure — all in one solution.

For more information write to Freepost 122, PO Box 292, Wellington.

Keeping you in touch



**Telecom**

# Christmas Computer Trivia Quiz

**Win this exciting Christmas package  
valued at more than \$2,000!**

**A COMMODORE 64 computer PLUS a 1541 disk drive  
A STAR SG10C Printer  
A subscription to Computex  
Two books from the Bits & Bytes Bookclub  
A year's subscription to Bits & Bytes magazine**

This is a quiz with a difference: the questions are all related to computing and have been designed by Bits & Bytes regular columnist, Gordon Findlay who says he'll be surprised if anyone gets them all right. So pick up your pen, put your thinking cap on, hunt out the information from the many sources available and be in to win this great package of goodies.

There are 30 questions in the quiz  
— 15 this month and 15 in the next  
issue.

**WAIT UNTIL YOU HAVE THE  
ANSWERS TO BOTH SETS OF  
QUESTIONS BEFORE SENDING  
IN YOUR ENTRY — DON'T SEND  
THEM IN SEPARATELY!**

## RULES

1. Answers must be written on plain paper, and clearly numbered to correspond with the questions.
2. All entries must have the NAME and FULL ADDRESS and TELEPHONE NUMBER of the entrant. Entries without these will be disqualified.
3. Correct answers to the questions have been agreed on by a panel of experts. If more than one fully correct or equally correct entry is received they will all be mixed, and the winner drawn at random from them.
4. The judges' decision is final and no correspondence will be entered into.
5. All entries become the property of Bits & Bytes Ltd and will not be returned.
6. Employees of Bits & Bytes and their immediate families are not eligible to enter. Employees and their immediate families from Commodore (NZ) Ltd and Genesis Systems Ltd are not eligible to enter.
7. The winner will be contacted before February 1 1986 and details of the winner/s and correct answers published in the January/February issue of Bits & Bytes.
8. All entries must be received on or before December 24th 1985

## Part 1

1. Whereabouts in the United States was the language BASIC first developed?
2. Name a programming language with a one character name.
3. Computers often communicate through a MODEM. Where does the word MODEM come from?
4. The Bits and Bytes box number is 9870. What is that in hex?
5. It's sometimes called a "five inch floppy", and sometimes a "five and a quarter inch floppy". What is the actual diameter of a mini-floppy disk (in inches)?
6. Gary Kildall has no doubt written many pieces of software. Which one has become most important?
7. No quiz is complete without a question about the Commodore. What is the name of Commodore's latest computer, due to be released here early next year.
8. And now dear reader, tell me true Who is it that they call "Big Blue"?
9. Farmers have taken quite a lot of interest in micros recently. What is the name of the unit at Lincoln College which has been researching the use of computers in farming?
10. What is the maximum number of bytes a Z80 (or 6502) processor can address without bank switching or extended addressing hardware?
11. One of the early computers was called ENIAC. What did ENIAC stand for?
12. A small computer — much like the ZX 81 — it didn't have BASIC built in. What it did have was originally designed for controlling telescopes. Name the computer, and the language.
13. In which issue of Bits and Bytes did the first advertisement for the Bookclub appear?
14. Of course you know that EPROMs are just erasable programmable read-only memories, but how are they erased?
15. He writes adventure games, and in ASCII his initials are 83 and 65. Who is he?

Just  
right for  
Christmas  
giving



# ATARI DEALERS ANNOUNCE GREATEST COMPUTER SAVINGS EVER!

**SAVE OVER \$500**

Your local Atari dealer has a new range of unbeatable values on special Christmas Pricebuster Packs of Atari Home Computers! Designed specially for family purchases this Christmas, these new package deals mean you can save over \$500 on complete Atari Home Computer systems.

Only  
**\$495.00**

## The Entertainment Pack

**SAVE \$200.00**

With Atari 800XL computer, Atari 1010 dedicated Program Recorder, fast-action joystick and 2 Atari Game Classic Program Cartridges.

Only  
**\$595.00**

## Plot Buster Pack Save \$238.00

With Atari 800XL computer, Atari 1010 dedicated Program Recorder, Atari 1020 four colour Plotter Printer and Atari Sketchpad Program and Demonstration Program on cassette.

Only  
**\$1,195.00**

## Wordpro Pack

**Save \$408.00**

With Atari 130XE Home Computer (that's 128k of RAM power), Atari Writer word-processor program on cartridge and Atari 1027 Letter Quality Printer with Elite typeface.

Only  
**\$1,595.00**

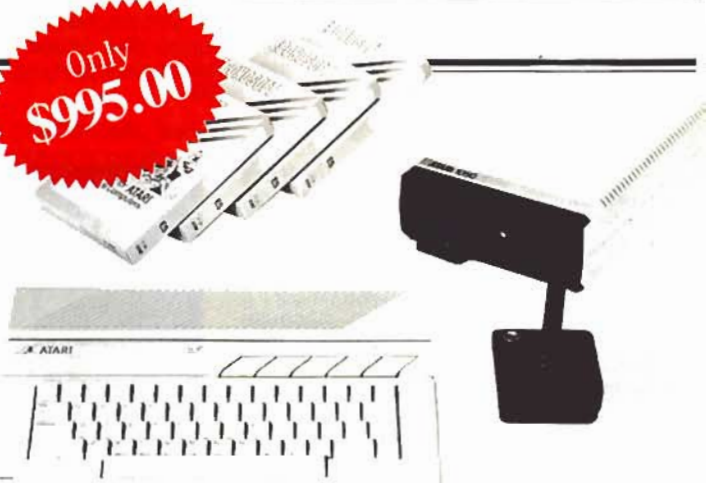
## Bizzwizz Pack

WITH FREE PRINTER

**Save over  
\$500.00**

For only \$1,595 you get the powerful Atari 130XE computer, the Atari 1050 Disk Drive, Atari Writer wordprocessor on cartridge, Syncalc spreadsheet program and, absolutely free, the Atari 1029 Dot Matrix Printer!

Only  
**\$995.00**



## 128k Disk Buster Pack

Save over \$260 on this special high-powered Atari package deal. For only \$995 you get the new Atari 130XE computer — which gives you a massive 128k of RAM, with over 96k of it user available — 4 special Atari programs on disk, the fast Atari 1050 dedicated Disk Drive and an Atari fast-action joystick.  
**All for only \$995.00**

## BUY NOW AND WIN \$1000 CASH

Buy your Atari Pricebuster Computer Pack before December 25th and you could win \$1,000 in crisp, fresh new dollar notes.

**SEE YOUR NEAREST ATARI  
COMPUTER STORE FOR THESE  
EXCITING PACKS AND ENTRY  
DETAILS!**

**COMPARE FEATURES!  
COMPARE PRICES!  
COMPARE QUALITY!**

**No other computer measures up to  
Atari!  
Ask your local computer store why!**

Here to save the  
world from high  
computer prices.

# ATARI



## PRICEBUSTERS

# The IBM PC JX Reaching for a new IBM market

By Richard Gorham

The arrival of a new Japanese-sourced: 16 bit micro-computer on the NZ market, with IBM PC "compatibility" and a price tag of under \$5000, would not be cause for more than a politely stifled yawn amongst even the most avid of NZ computer buffs.

The reason is that this type of event is no longer "news" — many micro-computers now have those IBM-like credentials.

Why then should I consider the possibility of more than passing interest in "just another clone".

Could it be that the computer under scrutiny here incorporates such features as 3.5 inch hard-cased floppy disk drives, or perhaps the infra-red keyboard, or even the potential availability of all your IBM PC software favourites on cartridge ROM?

I doubt it.

The one truly innovative feature of this newly announced microcomputer must be the fact that it is IBM itself that has joined the IBMulator brigade in unleashing yet another PC-clone on an (almost...) unsuspecting market.

And this is the key issue, because when IBM decides to release any new machine people sit up and take notice, be they consumers or competitors. The new JX model has been no exception, with most IBM dealers reporting plenty of consumer interest.

IBM NZ's stated rationale for releasing the JX (which has been available only in Japan and Australia) was ".....to address an area of the market not previously reached: namely those small businesses that are too small for a PC-G (the base model IBM PC senior) together with the farming sector, and the educational institutions".

These markets have certainly not been reached in NZ by the PC-G, and for one very good reason.

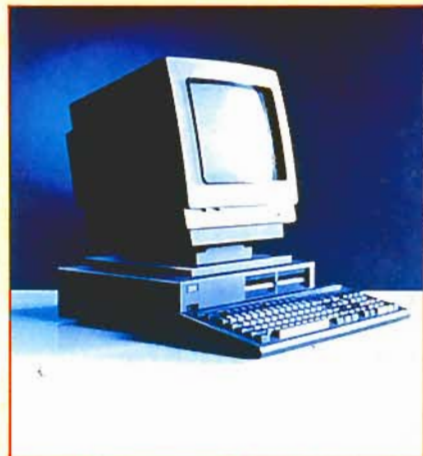
The price of PC-G in even its most basic configuration (1 disc drive, mono screen, and 128K memory) is around the \$7,000 mark; to be truly capable of reasonable business applications and exploiting the newer memory-hungry-and-graphics-supported software packages on the market you're spending around \$9,500 (2 discs, 384K, colour screen).

Contrast that with the prices of PC-JX.

In its basic "starter system" configuration (1x3.5 inch disk drive, colour screen, 128K) the JX will set you back \$3,846 — a little over half the price of a PC-G — and with a good colour screen to boot (sic).

For a more comprehensive business system (2x3.5 inch disk drives, 1 5.25 inch disk drive, colour monitor, 384K) you'll be paying \$6,617.

There is also a "disc-less" JX available for \$2,805 for networks of up to 64 machines, linked to hard-disk based XT



or AT model. So what do you get for your money, and exactly how does the JX measure up?

## The Hardware

The system reviewed was a business configuration JX with 384K, twin 3.5 inch disk drives, colour screen, one 5.25 inch PC-G compatible disk drive in expansion chassis, and colour screen (standard with all models in NZ).

My first impression of the system was the veritable mountain of cardboard box it was delivered in, complete with carrying handles; a change from the usual drab IBM packaging.

Once assembled, the computer manages to convey the appearance of a solid and well constructed machine while still being pleasant on the eye. In fact, the system looks more like a Japanese Hi-Fi model than a business computer, being a conservative charcoal grey with considerable attention to design details.

The CPU box itself is small enough to sit on a desk without making a nuisance

of itself...unlike the standard PC-G

In the "starter" configuration this box will contain the ubiquitous Intel 8088 microprocessor, 128K of RAM, one 3.5 inch Sony-type floppy disc-drive with controller, colour graphics screen adaptor, two ROM program cartridge slots, 8 octave triple-chord sound generator, Centronics-type parallel printer adaptor, cassette interface, 2 joystick interfaces, infra-red receiver for the keyboard and power supply (pew!).

A RS232C serial interface is an option.

A significant point about the JX is the use of new high-density custom designed chips to reduce size, power requirements, and price.

Five advanced technology gate arrays replace more than 180 conventional chips, and a one megabit ROM module is included (IBM claims this the first ever in a personal computer).

It would be hard to imagine all of the above fitting into such a compact box without this technology!

The JX's 8088 microprocessor runs at 4.77 Mhz, to preserve compatibility with the PC-G. This will no doubt disappoint those fortunate enough to have experienced the thrills of the later 8088-2 running at 8 Mhz — but is certainly adequate for most small-business applications.

## Less security

Up to 384K of RAM can be added to the standard 128K (within the CPU box) taking it up to a highly respectable 512K. This is achieved by plugging in one of several extra memory cards which are available. One of the cards holds 384K, and is approximately the same size as two packets of cigarettes placed end-together — very impressive.

The RAM used is 25% faster than PC-G memory (access time of 150ns against 200ns), but rather surprisingly sacrifices the additional security of parity checking (data auditing).

IBM PC-BASIC (i.e. written by Microsoft for IBM) is provided in part of the 96K of permanent onboard ROM, as well as being supplied in a more comprehensive version with the PC-DOS version 2.1 operating system on disc.

The 3.5 inch drives are similar to the type developed by Sony, but provide only 360K of formatted space on each \$17 disk (against 720K in most other implementations of these drives).



This approach has been taken to ensure that all data held on the PC-G's 5.25 inch drives can be transferred to 3.5 inch discs using the same DOS 2.1 commands — DISKCOPY, COPY etc.

A total of two 3.5 inch floppy disk drives can be fitted in the CPU box and a further 3.5 inch or single PC-G compatible 5.25 inch drive can be added if an expansion box is attached.

The expansion box has almost the same dimensions as the CPU box. It is attached to the system by removing the CPU box's top cover, stacking the expansion box on top of the CPU, and placing the removed cover on top of the expansion box. Wiring is connected internally by plugging a flat cable into a socket on the CPU box mother board — neat and tidy.

The expansion box has its own internal power supply, slots for 4 extra cards, and room for one floppy disk drive. Extra memory can be plugged into the slots if required, but 512K is the maximum system memory usable.

A 5.25 inch disk drive, if fitted, is half the height but functionally identical to the PC-G drives.



keyboard and CPU.

Use of the cable rather than infra-red is definitely recommended when more than one JX is in use in the same room at the same time, for obvious reasons.

## Using the machine

After checking the basics (i.e. 240V, 3-pin plugs etc) the machine was humming (whatever computers hum to themselves) within a scant 10 minutes of unpacking.

Rather than going into a detailed description of IBM PC-DOS 2.1 and other items relevant to the PC-G, I will try to highlight those areas of difference between the JX and PC-G (otherwise this would turn into a book rather than a review!).

The first thing to note on switching the machine on is the almost uncanny speed with which the machine completed its POST (power on self-test). I assume that this is partially because of the faster memory chips used, but mainly due to a disconcerting lack of parity checking. As is usually the case, you don't get anything for nothing.

Unlike the PC-G, there are no internal DIP switches to indicate to the system how much additional memory has been installed.

Thus if the machine has more than 128K of memory, then a special device-driver must be included in the CONFIG.SYS file on the boot-up disc.

Judging by the device driver's name (PCJRMEM.COM) this must also be the case for the JX's American cousin, the rather ill-fated PC Junior (being relaunched in the US for the Christmas market).

As a user without a disc-drive would not have the facility to load this device-driver, application programs could only take advantage of any additional memory by directly addressing it and using it

for work-space. However I would not see this being a realistic configuration of this machine anyway, so it shouldn't cause too many problems.

If PC DOS is not loaded (i.e. a DOS boot-up diskette is not present in drive a:) the ROM based version of PC BASIC automatically loads and is ready for use.

If a DOS boot-up disk is in drive a: then DOS 2.1 is loaded, and the user is presented with the usual bland DOS prompt "a:>".

In either case it is worth noting that the screen boots up in 40 column mode (another PC Jnr influence?). To use 80 column mode (and make best use of the high quality screen) one must either issue a BASIC instruction, or run a MODE.COM file from the DOS diskette.

A few 3.5 inch demonstration disks were supplied with the review machine, but unfortunately none of the new "Assistant" series was available at time of review. These seem to be the main thrust products for the JX, and include word processing, spreadsheet, business graphics and other essentials.

Most of my impressions were gained from running standard PC-G software by means of the 5.25 inch drive. This review was written using that old work-horse Wordstar, copied from 5.25 to 3.5 diskette (which is more convenient and durable).

In this implementation, I did not detect any significant difference between the 3.5 and 5.25 drives, in the time taken to access data. However I did find the graunching noise of the 5.25 drive, when being accessed, to be irritating.

## Performance

Another dislike was the keyboard's lack of any tactile feedback — it's hard to tell whether a key-depression has been registered without looking at the screen.

(Continued on page 42)

## Non-glare

The colour monitor that is provided with all configurations is a non-glare high resolution RGB1 version, and in conjunction with the supplied graphics system is capable of displaying 16 colours simultaneously in low-resolution (160 x 200 dots), 4 in medium (320 x 200), and 2 in high resolution (640 x 200).

A swivel stand is supplied with the monitor, and the monitor on stand sits nicely on top of the CPU box at around eye-level.

Interestingly, two versions of the screen are available depending on "the location of your country in the earth's magnetic field" — one for Hong Kong and one for the rest of Oceania.

A "full" 98-key keyboard was supplied, in contrast to a 79-key "compact" version (without a separate numeric keypad) which is optional.

The full keyboard layout is a considerable improvement on the PC-G's, with separate cursor control and numeric keys, and with the function keys (now labelled PF1-PF10) laid out horizontally left to right above the main keys.

An auxiliary "enter" key is also provided on the numeric keypad. Numerous other minor changes have also been made, including the movement of the "/" key away from the shift key — which is almost universally hated on the PC-G's keyboard.

Connection between the keyboard and CPU box can be made via either infra-red (cordless) transmission, or by plugging the 0.65 metre coiled cable into

(Continued from page 41)

More disappointingly, there doesn't seem to be the same type-ahead buffer on the JX keyboard as there is on the PC-G. It took me a while to become accustomed to the fact that you had to wait for commands to be processed before you could key in others.

But despite these annoyances, the keyboard is suitable for business use.

I found the infra-red option on the keyboard to be surprisingly useful (I must admit initial scepticism), and ended up discarding the interconnect cable. The range seems to be about 3 metres, but obviously the screen is getting rather difficult to read at that distance.

I ran some BASIC benchmark programs on the PC-G and JX and found that the JX is approximately 5% slower than the PC-G when running in-memory functions (i.e. looping whilst adding 1 to a counter) that do not access I/O.

But more of a surprise was the JX being approximately 5-10% faster than the PC-G (with colour adaptor) when accessing the screen. This is also evident in the JX's better scrolling and lack of the irritating flicker which is a hallmark of the PC-G.

I feel that overall the performance of the JX is adequate for most small-business applications that might otherwise



be looking to use a PC-G, but would question disk capacity limitations.

## Compatibility

Most PC-G software seems to be compatible with the JX, but obviously particular packages should be tried (the more thoroughly the better) with the machine before suitability of either software or hardware for a given application can be determined.

However, it is very unlikely that PC-G

software that must be "booted" (i.e. does not run under DOS directly) will run on the JX.

I tried running the Microsoft Flight Simulator, after having copied it down to 3.5 inch diskette with a COPY11JR duplicator program, but couldn't get it to boot. This might be seen to be an embarrassment to retailers of the machine as it seems to be a de rigeur test for PC-clone compatibility.

## Summary:

I was impressed with the IBM JX.

It has a comprehensive list of standard features, is well constructed, and can call on a large repertoire of available software, whilst being reasonably priced given its three lettered name-plate.

Providing that one does not require 100% software compatibility with its bigger brother, the PC-G, compatibility for plug-in accessories, or a larger disk capacity, then it is tempting to question the choice of a PC-G in preference to a JX.

I feel that overall the performance of the JX is adequate for most small-business applications that might otherwise be looking to use a PC-G, but would question the limited disk capacity while no hard disk is yet available as an

*A price and quality breakthrough!*

# INNOVA EXTENDED 80-COLUMN CARD

E-X-T-E-N-D-S YOUR APPLE //e WITHOUT  
S-T-R-A-I-N-I-N-G YOUR WALLET!

Now you can enjoy the benefits of a 128K The INNOVA Extended 80-column card  
//e for LESS THAN EVER BEFORE! with 64K expansion for your Apple //e:

- A huge 55K available for your AppleWorks™ desktop
- A 64K RAM disk with ProDOS
- Larger spreadsheets - 82K with Flashcalc, for example
- And you'll be able to enjoy all the new '128K-only' software (MouseCalc, LOGO II 128, etc.)
- New Zealand-made and supported. Top quality workmanship.
- 12 Month Warranty!
- Double hi-res graphics capability - 16 pure colours (255 shades) with 560x192 dot resolution!

**GREAT VALUE! ONLY \$198!**

FROM YOUR APPLE DEALER  
MANUFACTURED AND DISTRIBUTED BY INNOVATIVE COMPUTER SYSTEMS-BOX 78-053, GREY LYNN, AUCKLAND.  
PHONE (09) 766 487 · DEALER INQUIRIES WELCOME

option.

It should be noted that the Japanese version of the JX has a number of options: 10 Mb hard-disk (referred to in the JX PC DOS manual supplied with the machine under review), and a choice of one monochrome and two colour screens are available to the Japanese consumer in a marketplace that is considerably more competitive than NZ.

A 720-Kb (double-sided) floppy for the JX is also available in Japan.

In conclusion the JX is a very solid machine at a reasonable price, from the company that is the indisputable number one in the business computer market in NZ and overseas; a factor which should influence the adequacy of back-up service and support from independent dealers.

Given that the average NZ buyer is extremely cost-conscious and naturally suspicious of products without an established pedigree, then it could be that this machine has just the right combination of price and reputation to make it a big success for IBM in NZ.

### Microcomputer summary

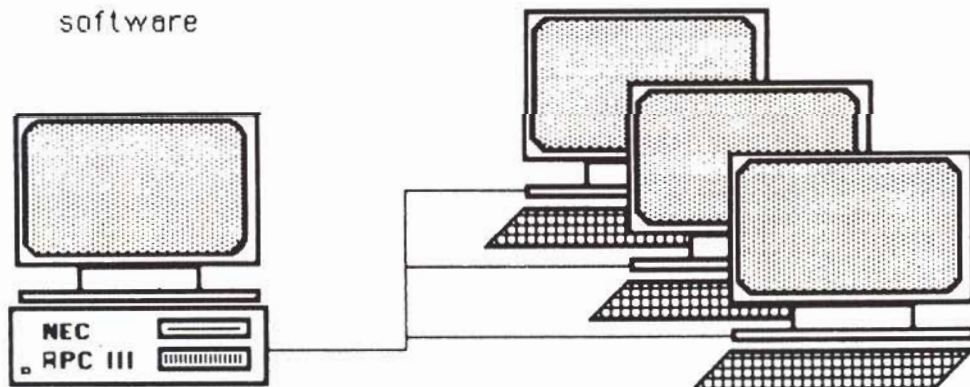
|                           |  |
|---------------------------|--|
| <b>Name:</b>              | IBM Personal Computer JX   |
| <b>Manufacturer:</b>      | International Business Machines.   |
| <b>Microprocessor:</b>    | 8088   |
| <b>Clock speed:</b>       | 4.77 Mhz.  |
| <b>RAM:</b>               | 64-512 Kb  |
| <b>ROM:</b>               | Two cartridge slots (not PC Jnr compatible)  |
| <b>Input/Output:</b>      | Ports for keyboard, display, rs-232C, Joysticks, audio, centronics, parallel printer, cassette taper, light pen.           |
| <b>Keyboard:</b>          | 98 and 76 key options, infrared and remote card, non-tactile.  |
| <b>Display:</b>           | 12-inch colour, non-glare four to 16-colour modes. Up to 80 characters in 25 rows.   |
| <b>Graphics:</b>          | 640 x 200 (4-colour) to 320 x 200 (16-colour).   |
| <b>Sound:</b>             | 8 octave triple chord generator.   |
| <b>Disc:</b>              | 360 Kb 3 1/2 inch single sided drive x 2   |
| <b>Options:</b>           | ROM cards, expansion unit with 5 1/4 inch drive, cluster adaptor   |
| <b>Operating systems:</b> | PC-DOS 2.1 Support   |
| <b>Languages:</b>         | Advanced BASIC and BIOS on integrated ROM module   |
| <b>Costs:</b>             | \$3,846 for 128 Kram single drive, \$6,617 for 384 Kram dual drive with expansion 5 1/4 inch drive unit. Further upgrades. |
| <b>Ratings:</b>           | (1 low - 5 high) Documentation 4, support 4, language 5, expansion 3, value 4.   |

*Review machine supplied by IBM NZ Ltd.*



## ANNOUNCE TIME-SHARING

This unique low-cost product turns a single-user PC into a high-performance multi-user system. Simply add on "dumb" terminals and you can run the full range of **MLS** multi-user software



MLS Time-sharing will be supplied only on selected machines and is initially available on NEC's APC III.

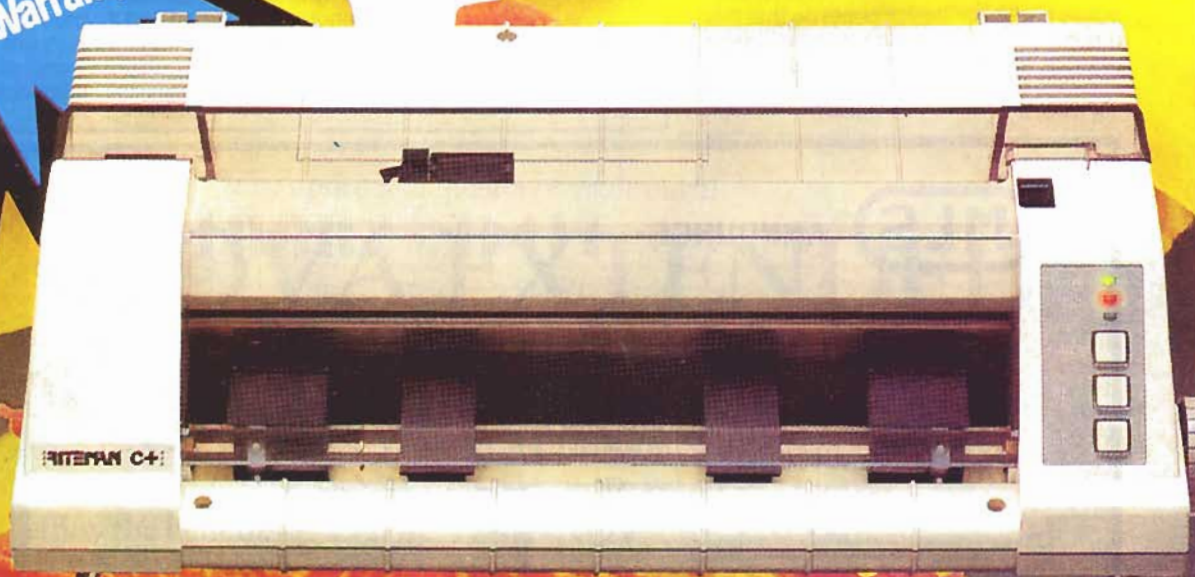
**For more information phone M L Systems on Ak 836-0558**

# MULTI-USER

# COMMODORE RITEMAN!



Plug-compatible with  
Commodore\* computers.  
2 software built-in:  
Commodore\* & Epson\*\*  
compatibility  
One-year Warranty



Available from

# COMPUTER NOW!

**PAPAKURA**  
SELWYN ARCADE  
GREAT SOUTH ROAD  
PAPAKURA  
TELEPHONE: 299-6112

**BROWNS BAY**  
CIVIC CENTRE ARCADE  
INVERNESS ROAD  
BROWNS BAY  
TELEPHONE: 478-1793

**PONSONBY**  
100 PONSONBY ROAD  
PONSONBY  
TELEPHONE: 792-494

**PUKEKOHE**  
9 QUEEN STREET  
PUKEKOHE  
TELEPHONE: (085) 85-855

**OTAHUHU**  
168 GREAT SOUTH ROAD  
OTAHUHU  
TELEPHONE: 276-4537

# Compare these specs before you buy...

## RITEMAN C + VS. COMMODORE PRINTERS

| FEATURES                 | RITEMAN C+ |                              | COMMODORE PRINTERS |         |         |         |         |
|--------------------------|------------|------------------------------|--------------------|---------|---------|---------|---------|
|                          |            | ACTUAL PRINT                 | MPS 801            | MPS 802 | MPS 803 | VIC1525 | VIC1526 |
| PRINT SPEED (CPS)        | 105        |                              | 50                 | 60      | 60      | 50      | 60      |
| BIDIRECTIONAL PRINT      | YES        |                              | NO                 | YES     | YES     | NO      | YES     |
| (COLUMN WIDTH)           |            |                              |                    |         |         |         |         |
| 40 CHARACTERS PER LINE   | YES        | 40 CPL                       | YES                | YES     | YES     | YES     | YES     |
| 80 CHARACTERS PER LINE   | YES        | 80 CPL                       | YES                | YES     | YES     | YES     | YES     |
| 66 CHARACTERS PER LINE   | YES        | 66 CPL                       |                    |         |         |         |         |
| 132 CHARACTERS PER LINE  | YES        | 132 CPL                      |                    |         |         |         |         |
| (PAPER HANDLING)         |            |                              | <h1>NO</h1>        |         |         |         |         |
| FRONT LOADING FOR        |            |                              |                    |         |         |         |         |
| EASY PAPER SETTINGS      | YES        |                              |                    |         |         |         |         |
| BUILT-IN PRINTER STAND   | YES        |                              |                    |         |         |         |         |
| PRINT ON POST CARDS      | YES        |                              |                    |         |         |         |         |
| (WARRANTY)               |            |                              |                    |         |         |         |         |
| ONE-YEAR WARRANTY        | YES        |                              |                    |         |         |         |         |
| (SOFTWARE COMMANDS)      |            |                              |                    |         |         |         |         |
| DOUBLE STRIKE            | YES        | DOUBLE STRIKE                |                    |         |         |         |         |
| EMPHASIZED               | YES        | EMPHASIZED                   |                    |         |         |         |         |
| COMPRESSED               | YES        | COMPRESSED                   |                    |         |         |         |         |
| UNDERLINE                | YES        | UNDERLINE                    |                    |         |         |         |         |
| SUPER/SUBSCRIPTS         | YES        | SUPER <sub>SUB</sub> SCRIPTS |                    |         |         |         |         |
| ITALICS                  | YES        | ITALICS                      |                    |         |         |         |         |
| DOUBLE DENSITY BIT IMAGE | YES        | CIR                          |                    |         |         |         |         |
| (CHARACTERS)             |            |                              |                    |         |         |         |         |
| 9X9 FONT                 | YES        |                              |                    |         |         |         |         |
| TRUE DESCENDERS          | YES        | abcbjppqyabc                 |                    |         |         |         |         |
| ITALICS                  | YES        | ITALICS                      |                    |         |         |         |         |
| COMMODORE GRAPHICS       | YES        | ↑♦♦↑ ◊ ▣ ▤ ▥ ▦ ▧ ▨ ▩         | YES                | YES     | YES     | YES     | YES     |
| (OTHER FEATURES)         |            |                              |                    |         |         |         |         |
| SINGLE DENSITY BIT IMAGE | YES        | CIR                          | YES                | NO      | YES     | YES     | NO      |
| EXPANDED                 | YES        | EXPANDED                     | YES                | YES     | YES     | YES     | YES     |
| REVERSE                  | YES        | REVERSE                      | YES                | YES     | YES     | YES     | YES     |

Available from

# The Computer Experience and Einsteins

The Computer Experience ph. 64-108  
154 Broadway, Palmerston North.

The Computer Experience ph. 81-969  
at D.I.C. Garden Place, Hamilton.

Einstein's ph. 851-055  
177 Willis Street, Wellington. or 844-353

The Computer Experience ph. 66-442  
Shop 41, Cashfields Mall, Cashel Street, Christchurch.

The Computer Experience ph. 730-348  
James Smiths, Cuba Street, Wellington.

The Computer Experience ph. 85-528  
Corner King & Egmont Streets, New Plymouth.

MAJOR CREDIT CARDS ACCEPTED. EASY PAYMENT TERMS.

# Uncommonly friendly approach

By Craig Beaumont

Locomotive Basic has a number of uncommon features that you can utilise to make your Amstrad more friendly. One in particular is the "soft" keyboard.

Each key can be programmed to give any character or even a string when hit.

A built-in example is the ENTER key on the keypad of the 464 which gives RUN with a carriage return- (enter character) when hit while pressing CTRL.

Each key has three modes — normal, shifted and control. In this case the control mode of the keypad ENTER has been predefined.

If you have a diskdrive it would be better if the carriage return wasn't there as you would then avoid the Bad command error. To do this and more try out the program listed.

Now if you type CTRL-T you get the number of minutes the computer has been on. CTRL-H is the HELP key suggested in the user guide for when you get lost on the screen. Key 3 on the keypad gives the amount of unused memory and CTRL-ENTER has been fixed for use with diskdrive.

This version has a diskdrive orientation, you could adapt it for other purposes by changing the keys and strings. There is a limit to the amount of key redefinition you can do, up to 100 characters may be used before getting an Improper argument error.

I hope this example plus reference to the user guide will help you make effective use of this feature of the Amstrad.

## Combat game

Last month I mentioned a few games that impressed me. Now I'm taking a closer look at the one Rowan would recommend you to put your goggles on for — it's Combat Lynx by Durrell.

This battle-ground helicopter simulation demands a lot in both dexterity and tactics.

Your role is the pilot of the only air support for your force. You must support a number of ground bases by ferrying personnel and wounded to and from base 1 — which happens to have an endless supply of weapons.

The enemy force comprises fighters, helicopters, tanks, trucks and the most fearsome — the gun emplacement. They constantly attack you, your ground forces and attempt to destroy your bases. You can take an aggressive role using the formidable battery of weapons at your disposal.

But the display is what makes the game. The 90 degree field of vision shows the contoured ground rolling beneath or perhaps rushing up to pluck you out of the sky. Other vehicles are clearly identifiable and they move intelligently.

The sound is O.K, it changes when you accelerate/decelerate — in fact you can go backwards!

Control of the Lynx is best with dual joysticks, or you can use solely keyboard or a mixture, but the acceleration keys are poorly placed.

Your main advantage over the enemy is an over-view map option. A nice touch is the score table which can be saved/loaded. Altogether this is one of the most challenging games around.

## Assembler

The most interesting thing I've heard of in the hardware field is about the first expansion ROM for the Amstrad.

It's an assembler that's supposed to be very fast and has the advantage of not taking up any of the memory used for program space. It is aimed at the more professional programmer - so it has a more professional price-tag.

At the moment only a small amount of software is available on disk - these are generally Amsoft games or Business packages.

It is expected that the percentage of programs available on disk will grow rapidly.

This will be helpful to users of diskdrives, because although the built-in software protection feature helps keep the price of software down, it is no help when you want to transfer what you won to disk ... that is, unless you have Transmat by Pride Utilities.

It allows easy transfer of programs between media, plus other facilities like disk header reading.

Another secondary storage utility by the same company is Syclone which allows you save on tape at higher baud rates and break the protection on software.

These are legal as long as you hackers out there keep the results of using these programs to yourselves - remember the copyright laws are being beefed up.

If you want to take advantage of the strong Kiwi dollar you may find it better to import these and other programs yourself, rather than wait for them to arrive here.

## Programmes

One way you can contribute to this column is by sending in the interesting CALLS, POKES and program modifications you discover.

To start the ball rolling: if you put CALL & BB18 in a program, the program will pause until you press a key - pretty useful huh!

If you can do better, then please tell everyone by writing to us. We'd also like to hear tips on playing games.

```

10 REM Key Redefiniton
20 KEY 0,"CAT"+CHR$(13)
30 KEY 1,"!DISC"
40 KEY 2,"!TAPE"
50 KEY 3,"?FRE(0)*+CHR$(13)
60 KEY 10,"CLS:LIST "
70 KEY 12,"RUN"+CHR$(34)
80 KEY 140,CHR$(13)+MODE 2
   INK 0,1:INK 1,24+CHR$(13)
90 KEY DEF 44,1,104,72,140
100 KEY 141,"?time/18E3"+CHR$(13)
110 KEY DEF 51,1,116,84,140
120 SPEED WRITE 1:MODE 2
130 PRINT*KEYS NOW DEFINED"
140 NEW:REM save before running.
```

## COMPUTER GAMES FOR HIRE

Games available for weekly hire for the following computers:

★ AMSTRAD ★ APPLE  
★ COM 64 ★ VIC 20 ★ BBC  
★ ATARI ★ TRS 80/SYS 80

Send for catalogue and membership details to:

COMPUTER GAME RENTALS LTD  
P.O. BOX 30947, LOWER HUTT.

Name .....

Address .....

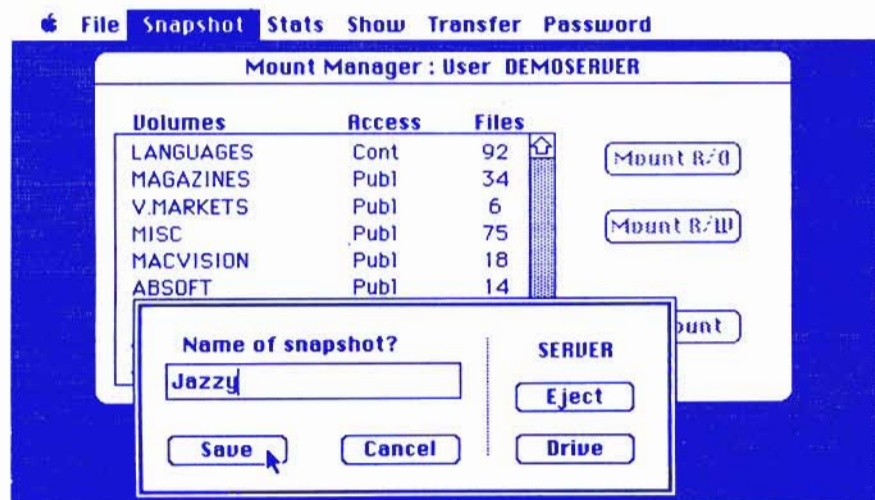
Type of Computer .....

# The Omnidrive

## Giving Mac more space

By Alex and Fred Wong

*The Macintosh computer, an excellent stand alone machine, also excels as part of a network like AppleTalk, recently introduced by Apple to form the Macintosh Office. The OmniDrive hard disk storage system range, from Corvus, is designed with both these functions in mind.*



A 'snapshot' of an auto-mount volume configuration

## Hardware

The Omnidrive is packaged in a handsome, unassuming plastic case the same colour and width (although a bit deeper), as the Macintosh.

On the front are three lights to indicate its status and on the back is a small connector for a serial cable to link to the Mac's modem port. Next to the connector is a set of DIP switches which configure the Omnidrive for single Mac operation or multi-Mac use.

Installation consists merely of plugging in the cable and the power cord and configuring the switches.

## Operation

Fred rocks (no rolling for him!) the switch on and the gentle fan begins to hum. He powers up the Macintosh and inserts the startup disk, and it places the hard disk icon (in this case specified as the Server volume, which includes all the programs needed to run the drive) on the desktop, and ejects itself.

The Omnidrive uses an application called the Volume Manager to create and maintain volumes on the drive and another called the Mount Manager to mount and un-mount them. A backup utility lets information from the hard disk to be saved onto floppies and it

announces how many disks it will take.

The Omnidrive managers provide basically the same services as the volume managers on the Quark and Tecmar hard disks, with some added features.

The Omnidrive allows several different configurations of auto-mount volumes and each configuration is 'snapshot-ted' as a document on the drive. By double clicking that particular snapshot, the volumes specified on that document is mounted. This is a handy feature, which almost eliminates any need to access the mount manager.

Other features are primarily for networking, to maintain private and public files and to ensure the integrity of data on the drive.

The Omnidrive is compatible with the

Apple Talk Personal Network. Using OmniTalk software, the drive may be shared among many computers using Apple Talk to provide hard disk storage for many Macintosh computers at once. Corvus also offers its own Constellation 3 networking software and cables.

This is an important feature, as networking, with its ability to share information and peripherals (such as the Omnidrive and Apple's LaserWriter printer) between computers, becomes more important for cost and efficiency conscious businesses and educators.

The Omnidrive uses Apple's standard Finder and operates approximately three times faster than a floppy.

It works professionally and although the Corvus software is somewhat more complicated to use, it also performs more complicated tasks. With the 45 megabyte version, our review model, the space on disk just does not run out!

## Documentation

The Omnidrive comes with three books. A small installation booklet that describes, with large, clear diagrams, how to plug in the drive, configure the DIP switches and how to set up a network. In Fred's famous words: "It had me up and running in a few minutes!"

Then there is a user's guide and a network manager's guide, both of which are very well presented. They give out huge amounts of information in a rambling, round-about way that leaves nothing out, if you can find it!

## Summary

The Omnidrive is a very sophisticated storage system for the Macintosh that has extensive networking capability built in. Although such power may be unnecessary for some potential hard disk users, an open upgrade path is often desirable.

The large range of Corvus Omnidrives leaves several price options to consider too, from the 5.5 meg to the 126 megabyte drive.

For dealers specifically, there is also the Demo-A-Mac, which is a 45meg drive.

### System summary

|                     |  |
|---------------------|--|
| Name:               | Omnidrive  |
| Manufacturer:       | Corvus systems, Inc., California.  |
| Type:               | 45 megabyte Winchester hard disk (also available in 5,11,21, and 126 megabyte models). |
| Features:           | Sophisticated networking capabilities.   |
| Reviewers' ratings: | Documentation: 3; ease of use: 4; value for money: 5; support: 4.                      |

(Review unit supplied by Computer Broking Services Ltd., Wellington.)

# Of Maturity, Novelty and Networks.

By Pip Forer

*This month a pot pourri: the recent expansions of the BBC design, a note on some new products and a utility to let you monitor BBC network use.*

## Maturity

First off there is the news of the enhancement of the BBC range...the BBC B.

The B is a 64k machine with expanded and reorganised RAM which incorporates an area of 32k of 'shadow' memory that can be used for screen support plus (the balance) for additional sideways RAM.

After two years of use I am still fundamentally impressed by a lot of the early design features of the Beeb and the redesign circumvents its main problem: when you use its excellent graphics you run out of RAM. The B also offers two extra ROM slots on a redesigned mother board.

The shadow RAM in the B can be switched in and out by software and when not in use the B works like a B. This offers software compatibility for existing applications.

If the RAM is utilised then some new OS calls allow direct access to shadow screen memory, extra RAM and better control of paging. The B is also set up (as the Apple 11e presaged the 11c) with facilities for 128k memory.

The upgrade allows for enormously enhanced software and in particular the second 64k can reconfigure as sideways RAM to hold language or utilities.

This expands software options enormously and cuts another bottleneck

for the demanding Beeb owner...the shortage of ROM slots.

It would also allow yet further expansion on BBC BASIC program size...this time to a full 64k.

Where does this leave the Beeb? Overseas reviewers have seen the B as an interim upgrade. Perhaps a good assessment is that at present many users can opt for 8-bit or MS-DOS machines. The latter offer power but less simple use, and at a cost.

The B retains the excellent features of the Beeb and stretches its power to keep it as a preferable option to MS-DOS in many circumstances.

Challenging both options, of course, are the new generation machines based on the user-oriented philosophy pioneered by Zerox and the Macintosh, and now being emulated by other companies.

In the long term these will sweep the current 16 bit machines away after a much briefer and lower level presence in the home and school than the 16 bitters, but they will take a while to get software.

The enhanced BBC is a good vehicle to bridge the gap and may also be a step along the road to an Acorn WIMPs machine.

## Novelty

One of the reasons for my optimism is the range of new items coming for

review, including some good educational programs (the Barsons stand at the NZCES conference was quite an Aladin's cave). The other is the network (see next section).

Firstly ViewStore, the Acorn database, is out and completes the VIEW trio. Its specifications look good and it is marked for review.

Also out is the mythical Graphics Extension ROM which will allow access to a far wider range of graphics commands FROM ANY LANGUAGE. These include patterned or quilted fills, movement of blocks of the screen, sprite management, primitive drawing (circles, ellipses etcetera) and a user specified range of dotted/pecked lines.

This offers in ROM many of the facilities only available in software screen-creation programs on other machines and augurs well for some great software if the ROM becomes standard issue.

PROLOG too has finally arrived and we will have an extended review of the BBC implementation as soon as a review copy comes to hand.

All in all the new developments dovetail well with the expanded Beeb and could be combined to produce a flexible and easy-to-handle system to meet a wide range of needs.

Another new product is a network bridge from Acorn. This allows several local nets to join while retaining their own autonomy. The benefit of this is that often degradation on a large network could be reduced by splitting it into smaller units (or wiring and administration may be simplified).

## Choosing a Payroll System Read this before you decide

- The T.C.S. PAYROLL provides detailed reporting on each employee, detailed reports for each pay run, detailed reports for employers for M.T.D. and Y.T.D. totals.
- The T.C.S. PAYROLL is extremely flexible providing for multiple hourly rates, unit rates, extras and deductions.
- The T.C.S. PAYROLL calculates all tax deductions and retains totals for quick, accurate printing of IR12 tax forms.
- The T.C.S. PAYROLL provides for both active and non-active employees.

- The T.C.S. PAYROLL allows for a mixture of different pay frequencies between employees.
- The T.C.S. PAYROLL calculates cash breakdown and banking splits.
- The T.C.S. PAYROLL provides for rounding of pay if required.
- The T.C.S. PAYROLL was completely written in N.Z. and is fully supported in N.Z.
- The purpose of this payroll system is to provide quick, accurate Payroll calculations, keep accurate records of employee totals and retain employer totals for necessary tax returns.

what you've been looking for ?

**T.C.S.**  
**PAYROLL**

at only

**\$499**

there really is no choice!

### SPECIFICATIONS

- Runs under MS-DOS 2. Available for IBM PC and compatibles also Sanyo 550 series (Commodore versions available)
- 128k memory for 200 employees
- 256k memory for 320 employees
- Hardware requirements
  - Minimum 128k RAM Micro Computer (MS-DOS 2)
  - One 360k Disk Drive
  - 80 column printer

THAMES COMPUTER SERVICES  
P.O. BOX 527 THAMES N.Z.  
PH (0843) 86 893

A Division of James Electronics Ltd

DEALER ENQUIRIES WELCOME



A useful feature of the bridge is that all the nets involved can share the same file server if desired.

It is a useful addition to the network and leads nicely into another addition network users may find helpful: a network log.

## Network use

Having recently reviewed networks for micros (predominantly 16-bit ones) Econet retains my deep respect.

It is unusual in being a network with an integrated design, i.e. designed by the machine designer's as integral to the concept of the whole system, and it offers better features than many networks several times its price, albeit more slowly than some business networks.

What it shares with many however is a lack of any accounting system. Most LANs are not designed to monitor who uses them or for how long because they are used within an organisation where such administration is unnecessary.

However, it is often desirable to know what proportion of the time machines are in use, or which form of pupils, class or discipline are most frequent users.

This can be particularly important where (as say in a school lunch period) access is informal.

What is presented below is a program to let you monitor such use, by machine or by user on a network.

Time on the machine is monitored in time units using the network interrogation routines described in Bits and Bytes' September issue.

You run this program from any Econet

machine. The catch is that at present this machine is then dedicated to that task. The user specifies the date and the time he wishes logging collected on. The program proceeds to check the network (say every minute) and builds a running list of a)users and b)machines in use.

It compiles an ongoing record of use, adding new users as they appear, until ESCAPE is hit when the program drops the log on to the printer and terminates. You can then see if Jones Minor has been hogging the system for too long or not.

What is impressive is the time taken to produce such an accounting procedure and the ease of production (even if currently it demands a whole machine to itself): a couple of hours at most. And it requires no more than a fundamental grasp of BASIC and the routines documented in the Acorn network managers' guide.

I offer very little in the way of explanation except to note the purpose of the following procedures:

```

IMODE 4
2CLS:PRINTTAB(3);"*) DO NOT TOUCH T
HIS MACHINE ((("
3PRI:TTAB(3,30);"*) DO NOT TOUCH TH
IS MACHINE ((("VDU28,0,27,39,3
4ON ERROR PROCwindLup
5 HIMEM=&57F0
6PROCsettimes
7top.user%=0:topmach%=0
10 REM

20 REM
30 REM

31DIMrdy% 10
32nmac%=10:nuser%=10
33DIMplayer%(10),name%(10)
34DIMkey% 3,cybkey% 16,whqbk% 28
  
```

```

35DIMallimen%(nuser%),allimac%(nmac%,2)
,allimen(nuser%)
  
```

```

53osword=&FHH1:osbyte=&FFF4
60 ?&57FF=&FA
65?&57FE=rdy%
66?&57FE=rdy% DIU 256
70 REM
71REM BYTES 2FFD-E ARE POINTERS TO TH
E rdy% control block and thence to all o
ther common data values.
  
```

```

75REPEAT
76 REPEAT
77 UNTIL TIME>lapse
91PROCplayer_scan
100PROCCassignstat
200PROCCassignuser
300CLS:PROCstatus
480TIME=0
499 UNTIL FALSE
500 END
10000DEFPROCsettimes:CLS:PRINTTAB(5,12);
"SCAN EVERY HOW MANY MINUTES ";INPUT ti
me
10005INPUT TAB(5); "What date for log";d
ate%
10010 lapse=time*6000:TIME=lapse:ENDPROC
  
```

```

11000DEFPROCassignstat:FOR I=0 TO cnt%-1
:USER=FALSE:FOR J=1 TO nmac%:IF player%(
I)=allimac%(J,1) THEN allimac%(J,2)=allimac
%(J,2)+1:USER=TRUE
11010NEXT J
11020IF USER = FALSE THEN PROCnewmachine
:topmach%=topmach%+1
11030NEXT I:ENDPROC
11040DEFPROCnewmachine:FOR IK=1 TO nmac%
:IF allimac%(IK,1)=0 THEN allimac%(IK,1)=p
layer%(I):allimac%(IK,2)=1:IK=nmac%
11045NEXT IK
11050ENDPROC
12000DEFPROCassignuser:FOR I=0 TO cnt%-1
:USER=FALSE:FOR J=1 TO nuser%:IF name%(I
)=allimen%(J) THEN allimen%(J)=allimen%(J)+1:
USER=TRUE
12010NEXT J
12020IF USER = FALSE THEN PROCnewuser:top
user%=topuser%+1
12030NEXT I:ENDPROC
12050DEFPROCnewuser:FOR IK=1 TO nuser%:IF
allimen%(IK)="" THEN allimen%(IK)=name%(I
):allimen%(IK)=1:IK=nuser%
12055NEXT IK
12060ENDPROC
15000DEFPROCstatus
15006PRINT"USER ID";TAB(18);"USE":PRINT
  
```

```

15010FOR I = 1 TO fopuser%:PRINTallimen%(
I),allimen(I):NEXT I
15015PRINT:PRINT:PRINT
15016PRINT"Machine No. ";TAB(25);"TIME US
E":PRINT
15020FOR J=1 TO topmach%
15030PRINTallimac%(J,1); " ",allimac%(J,2)
  
```

```

15040NEXT J:ENDPROC
16000DEFPROCwindLup
16004*FX21,0
16005:CLS:PRINTTAB(5,12);"PLEASE ENSURE
NET PRINTER IS ON":PRINTTAB(8);"STRIKE A
KEY WHEN READY":A%=INKEY*(10000)
16010*FX5,4
16015VDU2:PRINT"LOG TAKEN ON ";date%
16020PROCstatus:PRINT:PRINT:PRINT"TIME U
NITS ARE ";time;" minutes."
16030PRINT"Total scan time is given by t
he":PRINT"entry for the station number o
n the":PRINT"print header. If omitted it
is":PRINT"the longest used station."
16040VDU3
16050VDU26:CLS:PRINTTAB(12,12);"LOGGING
TERMINATED":END
  
```

# FBN SOFTWARE

|                     |          |
|---------------------|----------|
| SMARTKEY            | \$100.00 |
| SMARTPRINT          | \$ 40.00 |
| SMARTKEY/SMARTPRINT | \$120.00 |
| PC-ALIEN            | \$125.00 |
| SMARTSCREEN         | \$ 65.00 |
| SMARTPAK            | \$ 65.00 |
| SPATH               | \$ 40.00 |
| ASYNC               | \$ 80.00 |
| CLOCK LIBERATOR     | \$345.00 |
| MEMORY              | \$ 40.00 |
| QUADDRIVE           | \$100.00 |

*Delivery 2 weeks on your format*

**Enquiries  
& Orders**

Contact: Cliff Nighy  
**NZ FINE CHAINS LTD.**  
231 Khyber Pass Road  
Auckland 3. PH: 774-268

## MAKING SPRITES: Part 1

## The Sprite environment

By Dick Williams

We will look at Sega sprites and details regarding single and multiple sprites plus examples of various sprite patterns, including a fast no frills pattern editor program.

The drawings show how patterns are made up, plus mag modes and a sprite pattern for a kiwi.

Details regarding sprites are in the Sega blue book on pages 113-122 and this information is also in the disc manual.

A sprite can be thought of as a small blank postage stamp which can be drawn on and moved about on the graph screen without rubbing out anything which may already be drawn on the screen.

There can be quite a few sprites on view at any given time and each one can pass in front of or behind other sprites.

This is achieved by clever design of the screen controller built into the Sega to create the impression that there are 32 very thin additional screens in front of the normal graph screen.

These additional screens are reserved for sprites and can be imagined as very thin sheets of glass.

If a sprite is placed on one of these sprite screens it can be moved anywhere on it but does not interfere with other sprites on different sprite screens nor with anything on the graph screen.

This is shown in the Sega book on page 122. Note the numbering from 0-31 with the graph screen shown as behind the last sprite screen. You can only have one sprite on any sprite screen at once.

The sprite screen closest to you when viewing the TV is sprite screen 0 and because it is in front of all other screens, a sprite on sprite screen 0 will block view-

ing anything which may be directly behind it.

By placing moving sprites on different sprite screens, small images can move behind or in front of other images making for very realistic games. So the first thing to remember is that there are 32 sprite screens.

Sprites are 8 pixels square. They can be doubled in size to 16 pixels square and they can be combined, either normal size or double size, into groups of two, three or four sprites to create a larger size sprite.

Each sprite has to have a number to identify it. There can be a total of 256 sprites numbered 0-255 and any sprite, say sprite number 4, can be placed anywhere on either one sprite screen, or several sprite screens, or if you're really keen, can be placed anywhere on all 32 sprite screens at once.

There is a limitation in that only four sprites can be displayed on any horizontal line at one time.

You can place five sprites on a horizontal line (using five sprite screens) but only four will show and if you then move one of these four off the line then the fifth sprite will show.

A group of sprites is treated as one sprite so you can have four sprite groups on a horizontal line at once.

So the next items for your memory are: that each sprite you create must have a number, and you can only have four individual sprites or four sprite groups displayed on a horizontal line, at one time.

Each sprite can be any colour. All sprites in a sprite group will all be the same colour, however you can place different coloured individual sprites next to each other to get different colouring in

an image.

The code for placing sprite number 1 on sprite screen number 4 and giving it colour number 9 is:-

```
30sprite 4,(X,Y),1,9
```

First the sprite screen number, then the X Y coordinates, then the sprite number and the last item is the colour.

When you read the code it looks as though the first part should be referring to sprite 4 but no, the first part is the sprite screen number.

Before getting into more detail it might be a good idea to type in the sprite demo programs listed.

The first one (sprite 1) is very simple, it puts a black sprite in the centre of the screen.

Sprite 2 first draws a black bar across the screen and then places four coloured double size grouped sprites over the bar. Note that the sprites are on top of the bar and also that the colours remain true. The sprites can be easily moved on the screen by altering the X and Y numbers.

Sprite 3 shows a lot of sprites moving all over the screen behind of and in front of each other. Sprite screens used are numbers 1 to 24.

Sprite 4 is a more interesting pattern and can be substituted into sprite 3.

Sprite 5 uses the same pattern as sprite 4 with a random movement.

Now there are a couple of points to watch out for if you want to alter these demo programs.

The first is that I have used some strange combinations for the X,Y coordinates and if you alter them its quite likely you will get a statement parameter error which only means you are off the edge of the screen.

The other point is that in some cases I have used four patterns to set up a sprite.

If you delete some of these to see the affect, it won't do what you think because the computer still has the pattern in it's memory.

You can set a pattern to no pixels set by using this "0000000000000000"

## COMPUTERS AND SOFTWARE

for  
BUSINESS AND HOME



We stock the following models!

BONDWELL — COMMODORE — SPECTRAVIDEO  
AMSTRAD — ATARI

- Many specialised software applications available
- Many other products — games, computer furniture, joysticks.

**COMPUTERS LTD.**

29 High Street, Lower Hutt Ph: (04) 693-313

OPEN SATURDAYS.

Now you have some experience with sprites and should be ready for the next part — next issue — of setting the sizes of sprites using "mag" statements.

```

5 REM ---sprite 1---simple sprite---
10 SCREEN 2,2:COLOR1,15,,1:CLS
12 REM -----0123456789ABCDEF-
20 PATTERN S#0, "FFFFFFFFFFFFFFF"
30 REM ---place sprite-----
40 SPRITE 4, (125,80), 0, 1
50 REM -----
70 GOTO 70
10 REM ---sprite 2---4 sprites-----
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 LINE (0,72)-(255,82),15,BF
16 PRINT CHR$(12);"GRAPH SCREEN
18 MAG 3
20 PATTERN S#0, "FF8181818181FF"
22 PATTERN S#1, "FF8181818181FF"
24 PATTERN S#2, "FF8181818181FF"
26 PATTERN S#3, "FF8181818181FF"
28 REM -----
30 SPRITE 0, ( 20,60),0,1 :REM BLACK
32 SPRITE 1, ( 60,60),0,2 :REM GREEN
34 SPRITE 2, (160,60),0,4 :REM BLUE
36 SPRITE 3, (200,60),0,8 :REM RED
38 REM -----
40 GOTO 40

```

```

10 REM sprite 3---moving sprites--
12 SCREEN 2,2:COLOR1,15,,1:CLS:C=1
16 LINE (0,70)-(255,80),1,BF
18 PRINT CHR$(17);"GRAPH SCREEN
20 MAG 3
24 PATTERN S#0, "FF8181818181FF"
26 PATTERN S#1, "FF8181818181FF"
28 PATTERN S#2, "FF8181818181FF"
30 PATTERN S#3, "FF8181818181FF"
32 REM -----
34 FOR P= 1 TO 24
36 SPRITE P, (P * 10 * C,Y), 0, C
38 Y=Y+8: C=C+1: IF C>14 THEN C=1
40 NEXT P:Y=0:C=C+1:GOTO 34
5 REM sprite 4---beartoise in sprite 2
74 PATTERN S#0, "00193F3C1C002F2B"
76 PATTERN S#1, "0C002F2F02031B00"
78 PATTERN S#2, "000CFE9E9C1678ED"
80 PATTERN S#3, "1AF8F8F0EC7C3800"
10 REM sprite 5---random movement--
12 SCREEN 2,2:COLOR1,15,,1:CLS
14 MAG 3
16 PATTERN S#0, "071F3F415000C0C1"
18 PATTERN S#1, "FFFE7E67301F0703"
20 PATTERN S#2, "E0F8FC82B8B3A383"
22 PATTERN S#3, "FF7F7EE62CF8E0C0"
24 REM -----
26 X=RND(1)*220:Y=RND(1)*30

```

```

28 SPRITE 0, (X , Y), 0, 9
30 SPRITE 1, (Y*X, X), 0, 1
32 SPRITE 2, (X+Y,Y+X), 0, 2
34 SPRITE 3, (X+X,Y+Y), 0, 13
36 FOR P=1 TO 50:NEXT:GOTO 26
5 REM ---sprite 6---expanding sprites
10 SCREEN2,2:COLOR1,15,,1:CLS
12 PATTERNS#0, "0103070F1C3F70FF"
14 PATTERNS#1, "FF703F1C0F070301"
16 PATTERNS#2, "80C0E0F038FC0EFF"
18 PATTERNS#3, "FF0EFC38F0E0C080"
20 MAG 3
22 X=110:Y=78:X2=110:Y2=78:E=10
24 FOR S=0 TO 6
26 X=X-E:Y2=Y2+E:Y=Y-E:X2=X+E:IF C>14
THEN C=1
28 SPRITE0,(110,78),0,1
30 SPRITE1,(X,Y),0,2
32 SPRITE2,(X ,Y2),0,4
34 SPRITE3,(X2,Y),0,5
36 SPRITE4 ,(X2,Y2),0,6
38 SPRITE5 ,(X2,78),0,7
40 SPRITE6 ,(110,Y2),0,9
42 SPRITE7 ,(110, Y),0,10
44 SPRITE8 ,(X ,78),0,13
46 NEXTS:FOR P=1 TO 10:NEXT
48 IFE= 10THEN E=-10:GOTO 24
50 IFE=-10THEN E= 10:GOTO 24

```

## More for starters By Dick Williams

Here are a few more programmes for beginners, that were referred to in October's Bits and Bytes.

```

700 REM-----PROGRAM FOUR-----
710 FOR X=56 TO 57
720 SCREEN 2,2:COLOR1,15,,4:CLS
730 CIRCLE(165,95),70,1
740 CIRCLE(132,60),10,1
750 CIRCLE(190,80),10,1
760 CIRCLE(88,95), 8,1,3,0,1
770 CIRCLE(242,95), 8,1,3,0,1
780 CIRCLE(134,83), 5,1,,,BF
790 CIRCLE(188,83), 5,1,,,BF
800 CIRCLE(165,105),8,1,3,0,5,0,B
810 CIRCLE(165,54),85,1,1,,160,,340
820 CIRCLE(165, X),85,1,1,,160,,340
830 PAINT (165,140),9
840 CIRCLE (48,45),50,15,,5,0,1
850 IF X=57 THEN GOTO 900
860 COLOR1: CURSORS,160:PRINT CHR$(16)
:" THIS IS MY
870 PRINT :PRINT " BROTHER
880 COLOR1,11,(0,155)-(110,191),4:LINE
(0,154)-(111,154),1:LINE(111,154)-(111,191),1
890 IF X=56 THEN GOTO 930
900 COLOR1,11,(0,155)-(90,191),4:LINE
(0,154)-(91,154),1:LINE (91,154)-(91,191),1
910 COLOR1,15 : CURSORS,160:PRINT CHR$(16):" THIS IS MY
920 PRINT :PRINT " OTHER ONE"
930 PAINT(255,0),1

```

```

940 FOR P=1 TO 200:NEXT P
950 IF X=57 THEN GOTO 980
960 CURSOR15,40:COLOR4:PRINT CHR$(17);
"HELLO "
970 IF X=56 THEN GOTO 990
980 CURSOR12,40:COLOR1:PRINT CHR$(17);
"IDDYAY"
990 CIRCLE(165,0),130,1,1,,190,,31
1000 CIRCLE(165,90),60,1,1,,120,,360
1010 LINE (165,130)-(165,130),1
1020 LINE (155,129)-(155,148),1
1030 LINE (145,129)-(145,148),1
1040 LINE (135,127)-(135,142),1
1050 LINE (125,125)-(125,135),1
1060 LINE (165,130)-(165,150),1
1070 LINE (155,129)-(155,148),1
1080 LINE (145,129)-(145,148),1
1090 LINE (135,127)-(135,142),1
1100 LINE (125,125)-(125,135),1
1110 LINE (175,129)-(175,148),1
1120 LINE (185,129)-(185,150),1
1130 LINE (195,127)-(195,142),1
1140 LINE (205,125)-(205,135),1
1150 FOR P=1 TO 2000:NEXT P
1160 NEXT X
1180 GOTO 700
5 REM-----PROGRAM SIX-----
10 SCREEN 2,2:CLS
20 CIRCLE(35,140),5,1
30 CIRCLE(60,140),5,1
40 CIRCLE(85,140),5,1
50 CIRCLE(115,140),5,1
60 CIRCLE(145,140),5,1
70 CIRCLE(170,165),5,1
80 CIRCLE(190,165),5,1
90 CIRCLE(215,165),5,1
100 CIRCLE(240,165),5,1

```

```


110 LINE(35,135)-(145,135),1
120 LINE(150,140)-(135,165),1
130 LINE(130,170)-(50,170),1
140 LINE(45,165)-(30,140),1
150 LINE(30,130)-(150,130),1
160 LINE(150,130)-(155,135),1
170 LINE(135,135)-(150,145),1
180 PAINT(35,140),1
190 PAINT(60,140),1
200 PAINT(85,140),1
210 PAINT(115,140),1
220 PAINT(115,140),1
230 PAINT(145,140),1
240 PAINT(130,165),1
250 PAINT(140,165),1
260 PAINT(175,165),1
270 PAINT(50,165),1
280 LINE(30,130)-(25,135),1
290 LINE(25,135)-(25,140),1
300 LINE(130,120)-(140,130),1
310 LINE(130,120)-(145,120),1
320 LINE(45,120)-(40,130),1
330 LINE(55,120)-(60,95),1
340 LINE(60,95)-(95,95),1
350 LINE(95,95)-(100,120),1
360 LINE(100,120)-(95,95),1
370 LINE(95,100)-(175,95),1
380 LINE(100,105)-(175,100),1
390 LINE(175,100)-(175,95),1
400 LINE(175,95)-(185,30),1
410 LINE(185,30)-(190,30),1
420 LINE(190,30)-(210,95),1
430 LINE(210,95)-(230,95),1
440 LINE(175,100)-(185,105),1
450 LINE(185,105)-(195,105),1
460 LINE(195,105)-(210,100),1
470 LINE(210,100)-(240,100),1
480 LINE(240,100)-(230,95),1
490 LINE(40,140)-(140,140),1
500 LINE(135,135)-(145,150),1,BF
510 LINE(90,95)-(85,70),1
520 PAINT(185,95),9
530 PAINT(100,125),2
540 PAINT(85,110),10
550 LINE(100,100)-(100,105),1
560 LINE(100,110)-(100,100),1
570 LINE(100,110)-(110,105),1
580 LINE(110,105)-(110,100),1
590 PAINT(125,124),1
600 GOTO 600

```

### Business people-

Get professional sales and support from Kapiti Coast's Computer Specialists.

Authorised  
**SANYO** and  
**Commodore** Dealer



## KAPITI

Independent  
business  
machines  
limited

Beach Chambers, Seaview Rd,  
Paraparaumu Beach. Tel: 88-277  
Open Mon. to Sat. -9am-5pm

110 LINE(35,135)-(145,135),1

120 LINE(150,140)-(135,165),1

130 LINE(130,170)-(50,170),1

140 LINE(45,165)-(30,140),1

150 LINE(30,130)-(150,130),1

160 LINE(150,130)-(155,135),1

170 LINE(135,135)-(150,145),1

180 PAINT(35,140),1

190 PAINT(60,140),1

200 PAINT(85,140),1

210 PAINT(115,140),1

220 PAINT(115,140),1

230 PAINT(145,140),1

240 PAINT(130,165),1

250 PAINT(140,165),1

260 PAINT(175,165),1

270 PAINT(50,165),1

280 LINE(30,130)-(25,135),1

290 LINE(25,135)-(25,140),1

300 LINE(130,120)-(140,130),1

310 LINE(130,120)-(145,120),1

320 LINE(45,120)-(40,130),1

330 LINE(55,120)-(60,95),1

340 LINE(60,95)-(95,95),1

350 LINE(95,95)-(100,120),1

360 LINE(100,120)-(95,95),1

370 LINE(95,100)-(175,95),1

380 LINE(100,105)-(175,100),1

390 LINE(175,100)-(175,95),1

400 LINE(175,95)-(185,30),1

410 LINE(185,30)-(190,30),1

420 LINE(190,30)-(210,95),1

430 LINE(210,95)-(230,95),1

440 LINE(175,100)-(185,105),1

450 LINE(185,105)-(195,105),1

460 LINE(195,105)-(210,100),1

470 LINE(210,100)-(240,100),1

480 LINE(240,100)-(230,95),1

490 LINE(40,140)-(140,140),1

500 LINE(135,135)-(145,150),1,BF

510 LINE(90,95)-(85,70),1

520 PAINT(185,95),9

530 PAINT(100,125),2

540 PAINT(85,110),10

550 LINE(100,100)-(100,105),1

560 LINE(100,110)-(100,100),1

570 LINE(100,110)-(110,105),1

580 LINE(110,105)-(110,100),1

590 PAINT(125,124),1

600 GOTO 600

## Bounding robouncers!

By Stefan Schmidt

And yet again you are called out to defend planet Earth from a new alien threat — Robouncers.

If, by chance, enemy destruction has propelled you out of the first three levels, with casualties at a minimum, then the next number of levels will prove to be harder.

As the game progresses, your playing screen decreases, and the aliens' combine forces to pelt down en masse.

After that nerve-racking experience, the series of levels become even more exacting: the sequences of difficulty become more concentrated, your playing screen becoming smaller, the invaders more numerous, and to top it all off, they now fire missiles too.

When I first encountered Robounce I

was playing via keyboard, and it was difficult because the movement of my craft was too slow to respond and its force-field was active too long.

The use of the joystick proved more challenging. The Robouncers bounced faster, the force-field was only up for a short period of time, and the movement of my craft improved dramatically.

Within this Michtron package is a silent mode, a pause mode, and an abort mode (for bad starts).

There are a few let downs such as the quality of graphics and the sound, which to me was an "insult" to the Sanyo MBC 550/555 capabilities.

## Compatible upgrade

Sanyo has introduced another IBM PC "compatible" series, consisting of the Executive PC with dual 360K disk drives, the Executive XT with an internal 10 megabyte hard disk, and the Executive XT20 which has a 20 megabyte capacity.

It is Sanyo's first PC with internal hard disk.

Sanyo Business Systems' Ken Davis says the new computers offer additional features, while costing just over half the price of the IBM PC.

Colour graphics is standard, as is switchable clock speeds of 8MHz and IBM's 4.77MHz.

It has seven available expansion slots, five full-sized and two half-sized.

An eighth is utilised for the colour graphics card and the parallel printer interface.

With a 140 watt voltage regulated power supply, the series has sufficient power to handle a number of peripherals and to even-out voltage fluctuations.

Bundled software includes word processing, GW Basic and MS-DOS 2.11 operating system.

A detachable sculpture-type keyboard has 84 keys and numeric keypad, LED indicators, and special function keys.

The Executive series ranges in price from \$3695 for the PC to \$7595 for the XT20, with the mid-range Executive XT, with its 10 megabyte internal hard disk, selling for less than \$7000 (with monitor).

Since PC-DOS is almost identical to MS-DOS, you will find that a lot of IBM Public Domain will run on the Sanyo.

Occasionally, though, you will find a certain difficulty in getting the program to run on the Sanyo. Sometimes this can be attributed to the difference between the IBM keyboard and the Sanyo's

| IBM KEYBOARD | SANYO KEYBOARD   |
|--------------|------------------|
| ALT          | CTRL + =         |
| CTL+PF1      | CTRL + SHIFT     |
| CTL+PF2      | CTRL + SHIFT + { |
| CTL+PF3      | CTRL + SHIFT + } |
| CTL+PF4      | CTRL + SHIFT + : |
| CTL+PF5      | CTRL + SHIFT + " |
| CTL+PF6      | CTRL + ;         |
| CTL+PF7      | CTRL + ' /       |
| CTL+PF8      | CTRL + ,         |
| CTL+PF9      | CTRL + .         |
| CTL+PF10     | CTRL + /         |
| ALT+PF1      | CTRL+PF1         |
| ALT+PF2      | CTRL+PF2         |
| ALT+PF3      | CTRL+PF3         |
| ALT+PF4      | CTRL+PF4         |
| ALT+PF5      | CTRL+PF5         |
| ALT+PF6      | CTRL+SHIFT+PF1   |
| ALT+PF7      | CTRL+SHIFT+PF2   |
| ALT+PF8      | CTRL+SHIFT+PF3   |
| ALT+PF9      | CTRL+SHIFT+PF4   |
| ALT+PF10     | CTRL+SHIFT+PF5   |
| SHIFT+PF1    | CTRL + 1         |
| SHIFT+PF2    | CTRL + 2         |
| SHIFT+PF3    | CTRL + 3         |
| SHIFT+PF4    | CTRL + 4         |
| SHIFT+PF5    | CTRL + 5         |
| SHIFT+PF6    | CTRL + 6         |
| SHIFT+PF7    | CTRL + 7         |
| SHIFT+PF8    | CTRL + 8         |
| SHIFT+PF9    | CTRL + 9         |
| SHIFT+PF10   | CTRL + 0         |
| CTL + 2      | CTRL + ' /       |
| CTL + 6      | CTRL + SHIFT + * |

# PUT YOURSELF IN THE EXECUTIVE SEAT.

Let us introduce you to the new Executive PC Series from Sanyo.

This high performance desk-top computer range consists of:

The EXECUTIVE PC, with dual 360K disk drives, the EXECUTIVE XT, with an internal 10 megabyte hard disk and the EXECUTIVE XT20, with 20 megabyte

capacity.

Coupled with Sanyo's traditional value for money and unique 4-year guarantee — we're sure you will be impressed!

The Sanyo Executive — built to do the job and do it fast.



Please send me details on the Executive Series

Name

Address



**SANYO**  
BUSINESS SYSTEMS

Freepost 2002 PO Box 74035, Auckland  
Telephone (09) 505-119

EXP/12/86 180

# How to get more RAM

By Don Stanley

Last month I mentioned that SV328 owners could get an extra 32K of ram under machine code, and 318/328 owners could access the video ram as temporary storage. Here's how its done for the spare ram bank, the video ram use will come later.

Note that all port addresses throughout are in hex.

There is no reason why the machine code routines in this article could not be adapted for 64k MSX machines; in most cases only the port addresses need changing.

Starting with the spare 32k ram in the 328, you need to know a little about machine code and also how to switch the roms out.

The Listing 1 routine will switch out the roms, and the Z80 CPU can then access the other 32K ram which exists at locations 0 to &H7FFF.

The Listing 2 program will re-enable the roms when your machine code routine is through and you need to go back to BASIC.

When you have called ROMOUT from a machine code routine you can not access the roms any more until ROMIN is called. Thus you can not use any BASIC routines like printing to the screen and so on.

However you can switch the roms in and out at will, so by using a series of ROMIN and ROMOUT commands you can use the rom and switch back again.

When the rom is switched in, nothing which you stored in the spare ram is lost. You can also locate machine code programs in the spare bank, but ensure that you don't try to access the roms.

By the way, CPM does exactly this. There are a number of routines such as read character, scan the keyboard, print a character which CPM swaps the roms in to carry out.

## An example

To use the above, as an example say you wanted to store a large text file in the spare bank and have a BASIC program using all the 29K in the usual user bank. Your machine code program would be along the following lines. . . (this routine starts at &H9100 in the BASIC programs in this article).

```
CALL ROMOUT ; disable roms
LD DE, (address1) ; first adr to move to
LD HL, (address2) ; first adr to move from
LD BC, (length) ; # bytes to move
LDIR ; move
CALL ROMIN ; re-enable roms
```

```
RET ; to BASIC
```

The locations address1, address2 and length would be defined in BASIC, and would be filled with the address to write to in the spare bank, the address to read from in the usual bank and the number of bytes to move from the usual bank to the spare. Your BASIC segment would look something like Listing 3.

The above machine code routine would have address1, address2, length replaced by &HD150, &HD152, &HD154 respectively. The outcome of the Listing 3 segment would be that the string which is at location &HD200 and is 225 bytes long is copied to the spare bank starting at location 0 and then transferred back to the usual ram from location &HA000 onwards.

The sort of things that I find this useful for is when I would normally have a large string array eating up the usual ram.

I can force each string to be 255 bytes long by adding nulls to the end, fill up the 32K spare bank with the strings and then just reaccess the one I need later. Then I only ever have one array element in the usual ram.

The space saving in the user ram can be enormous, as the array would require 3 bytes for every element plus the string itself.

Making each string 255 bytes long helps avoid having to keep track of the number of bytes to read and write to and from the spare bank.

## Experiment

For anybody who wishes to experiment further with this you will find the following locations very useful. They are used by DEFUSR to manipulate the argument in the USR(argument) call.

It is often easier to pass VARPTR (strings\$) to the routine than doing the POKES but your machine code routine needs to be able to sort out what is what.

If the argument is an INTEGER, then the integer is store din locations &HF925/26.

If the argument is a string, &HF925/26 hold the address in memory at which the string descriptor is located.

If the argument is a single precision number then the number will be in &HF923--&HF926, and a double precision number will be in &HF923-&HF92A.

The type of argument (string/integer/single/double) will be stored in F793. (2=Integer 3=string 4=single 8=double).

A string descriptor contains 3 bytes, the first is the length of the string and the

## FAREWELL... AND HELLO

After a year long run, Alex and Barbara Bridger have retired from writing our Spectravideo columns.

But being the reliable types that they are, they had arranged for the chairman of the NZ Spectravideo Users Association, Don Stanley, to continue offering the high standard of information long evident in this column.

Don introduces himself as:

"A computer fanatic with particular interest in the micro field.

"I have degrees in mathematics and statistics and these reflect my major interest in the micro field. I have been a programmer/analyst for five years, in both the medical research and banking fields. I have recently started up a software/ consulting/ training company in Wellington along with several others.

My connections with user groups include being the founder and first secretary of the Wellington Spectravideo Group, being the first chairman of the NZ Spectravideo Users Association and being a member of the New Zealand SAS Users Group Committee. I am also the editor of the WGTN SV Clubs newsletter at this stage, and have been since June 1984."

second is the location in memory where the actual string is stored.

To pass a value back to BASIC, just fill the above locations with the value and ensure that you fill F793 with the type. Then, for instance, a call like A=USR(0) will see A contain the value that the routine placed in &HF925/26, if it is an integer.

## Strings

To use this with strings, a call like A=USR(VARPTR(a\$)) would see the location of the string descriptor placed in &HF925/26. You would need to modify the routine above to match Listing 4: (this routine starts at &H9000 in the BASIC program Listing 5).

The BASIC program would be modified to that in Listing 5 which shows how to move a string variables value into the spare bank, and how to move from the spare bank into an area of ram and then to another string variable.

That really covers how to move bytes between the spare and normal RAM banks. It is up to your ingenuity with machine code and BASIC as to how you use this extra space. Go to it.

(Continued on page 55)



**TANDY...**

ADVANCED TECHNOLOGY

IBM-PC COMPATIBLE



- ★ Runs most IBM-PC software, e.g. Flight Simulator, dBase III, Framework.
- ★ Graphics/colour board included as standard.
- ★ 90 Key keyboard with CAPS and NUM Lock Lights.
- ★ Takes many IBM hardware boards.
- ★ Most communication protocols available.
- ★ Includes as standard Desk Mate applications package featuring Text processor, spreadsheet, filer

from only **\$3900**



**CHRISTCHURCH**  
149 Hereford St.  
P.O. Box 2823  
**PH 797-279**

**WELLINGTON**  
Dominion Bldg.  
35 Mercer St.  
**Ph 731-097**

(Continued from page 53)

If you don't feel up to using machine code but still want to use the spare bank, the program "Memory Expansion" will let you store programs in the spare bank and switch it back and forth with the main bank. Your local SVI dealer should have a copy of "Memory Expansion".

## LISTING 1

```

ROUT:  D1
        LD  A,B
        OUT (00),A
        IN  A,(90)
        AND FE
        OUT (0C),A
        RET

```

## LISTING 2

```

ROUT:  LD  A,B
        OUT (00),A
        IN  A,(90)
        OR  A2
        OUT (0C),A
        EI
        RET

```

## LISTING 3

```

100 CLEAR 500,M0200
110 L1=M0150 : L2=M0152 : L3=M0154
120 FOR I=M0200 TO M0200 +224
130 POKE I,1212
140 NEXT
150 A1=0
160 A2=M0200
170 L=225
180 GOSUB 500
190
200 * ABOVE PUT STRING IN SPARE BANK -- NOW PUT IT BACK AT ADDR
210
220 A1=50000
230 A2=0
240 L=225
250 GOSUB 500
260 FOR I=50000 TO 50000 +224
270 PRINT HEX(I);CHR(PEEK(I))
280 NEXT
290 END
300 POKE L1,A1 AND 255
310 POKE L1+1,255 AND (A1-(A1 AND 255))/255
320 POKE L2,A2 AND 255
330 POKE L2+1,255 AND (A2-(A2 AND 255))/255
340 POKE L3,L AND 255
350 POKE L3+1,255 AND (L-(L AND 255))/255
360 DEF USR=50700 : A=USR(0)
370 RETURN

```

## LISTING 4

```

CALL  ROUT      ; disable roms
LD      HL,(F725) ; string des address in HL
LD      C,(HL)   ; length of str in C
INC     HL       ; point at string start
LD      E,(HL)
INC     HL
LD      D,(HL)
EX      DE,HL
LD      DE,(address) ; start address to move to
LD      B,0
LDIR
CALL    ROUT     ; re-enable roms
RET

```

## LISTING 5

```

100 CLEAR 000 : DEF USR=507000 : DEF USR1=507100
110 L1=M0150 : L2=M0152 : L3=M0154
120 A=STRING$(225,191)
130 A1=0
140 POKE L1,A1 AND 255
150 POKE L1+1,255 AND (A1-(A1 AND 255))/255
160 A=USR(VARPTR(A))
170
180 * ABOVE MOVED STRING TO SPARE BANK -- NOW PUT IT BACK AT C500
190 * AND BUILD B4 FROM THERE
200
210 A1=M0500
220 A2=0
230 L=225
240 POKE L1,A1 AND 255
250 POKE L1+1,255 AND (A1-(A1 AND 255))/255
260 POKE L2,A2 AND 255
270 POKE L2+1,255 AND (A2-(A2 AND 255))/255
280 POKE L3,L AND 255
290 POKE L3+1,255 AND (L-(L AND 255))/255
300 B=USR1(0)
310
320
330 FOR I=A1 TO A1+L
340 B4=B4+CHR(PEEK(I))
350 NEXT
360 PRINT B4

```

**Protocol converter**

Organisations using only a single personal computer could be interested in a low-cost protocol converter which, by converting ASCII to SNA/SDLC, enables any personal computer or terminal or printer to be hooked up to any mainframe computer, according to the distributor, Mitsui Computer Systems Ltd.

# DO YOU BELONG... to the Commodore 64 Computer Program Library?



## **commodore**

The library now contains over 40 Disks — more than 650 programs, covering areas of Education, Recreation, training and programming.

**PROGRAM DISKS INCLUDE: (with the number of programs in brackets)**

Computer Science (13), Business I (14), English (14), English II (16), English III (15), English IV (15), English V (13), English VI (12), English VII (3), Games I (14), Games II (13), Games III (7), Geography (13), Math I (14), Math II (15), Math III (15), Math IV (14), Math V (15), Math VI (15), Math VII (16), Math VIII (11), Science I (12), Science II (12), Science III (12), Science IV (12), Technology (10), Music I (17), Vowel Sounds (5), Economics, Accounting, Ponzio Tutor, Science V, Awareness, Mark Manager, Steves #1, Steves #2, French, Seminar, Chemistry, Primary.

**PLUS**

August Disk (28) September Disk (18) October Disk (24) November Disk (21) December Disk (23)  
Pictures — Hi Resolution (12 excellent pictures) Textmaster — An excellent Wordprocessor for children.

Any person is eligible to join the official Commodore Computer (NZ) Ltd Software Library.

# DO IT NOW!

**MEMBERSHIP COST**

**\$15**

**PROGRAM CHARGES**

**\$14.95 per Disk  
(only on Disk)**

(This charge covers the cost of the disk, copying, documentation, postage and packaging)

Send To: Commodore Computers (NZ) Ltd.  
PO Box 33847 Auckland 9.

I want to join the Commodore 64 Software Library

NAME: .....

ADDRESS: .....

.....Signed: .....

PLEASE SEND ME

- Information about the Monthly C64 Disk Specials
- Complete Library Catalogue

Membership fee enclosed

The monthly newsletter



# Character editing: part two

By Joe Colquitt

If you have done any experimenting, you should be quite comfortable with the concept of redrawing characters. Let's take a look at colour and different video banks.

Character multicolour can be a bit of a handful at times. If you read my articles on sprites (and digested them), you should be familiar with "bit pairs". A character is made up of an 8 x 8 grid, like this:

```

00000000  BYTE 0
00000000
00000000
00000000
00000000
00000000
00000000
00000000  BYTE 7
  
```

The top eight dots are the bits in byte 0, and can be split into four pairs:

```

00 00 00 00
  
```

In any pair, if the left dot only is on (\*), the colour for the pair will be value in 53283. If the right dot only is on, the value in 53282. If both dots are off, the value in 53281 (background). If both dots are on, the colour is in the range black-yellow, and is a value between 8-15 in colour RAM — add eight to the normal POKE value for that colour. Note that multicolour mode is not enabled for that screen location if its colour RAM value is less than eight.

To turn multicolour mode on, POKE53270,PEEK(53270)OR16. This small program will illustrate these points.

```

10 FOR I=0T07:POKE12288+32*8+I,0:NEXT:REM CLEAR THE SPACE CHARACTER
20 FOR I=0T07:POKE12288+I,204:NEXT:REM MAKE '0' EIGHT ROWS OF ..*..
30 FOR I=0T07:POKE12288+I,170:NEXT:REM MAKE 'A' EIGHT ROWS OF *.*.
40 FOR I=0T07:POKE12304+I,25:NEXT:REM MAKE 'B' EIGHT ROWS OF .*.
50 FOR I=0T07:POKE12304+I,170:NEXT:REM MAKE 'C' EIGHT ROWS OF ..*..
60 POKE1024+I,0:POKE1025+I,1:POKE1026+I,2:NEXT
70 POKE53272,28:POKE53270,PEEK(53270)OR16
80 A=1
90 POKE53281,0:POKE53282,7:POKE53283,6
100 FOR I=0T0113:POKE55296+I,A:NEXT
110 POKE198,2:WAIT198,1:POKE198,0:A=(A+1)AND15:GOTO100:P_L_3,
  
```

Run the program, and after the three lines are POKEd at the top of the screen, press any key to increment the value in colour RAM. Notice that the first eight key presses change the colours of the characters, but do not enable multicolour. However, the instant colour RAM value goes past seven (yellow), the characters are seen in their multicolour format. To exit the program, either STOP/RESTORE or POKE 53272,20:POKE 53270,PEEK(53270)AND239. Also try different POKE values in lines

20-40 and 90.

These principles apply to "PRINTS" as well. If you substitute this line for lines 40-50, then by putting a colour command where the \* is, multicolour can be turned on/off by commands > (yellow) or < (orange). Print "@@ @@@ AAA BBB".

## Extended background

Extended background is the process of having multicolour hi-res characters without going in to multicolour mode. This small routine to demonstrate:

```

10 PRINT"0":FOR I=55296T055605:POKE I,1:NEXT
15 PRINT"53281"
16 PRINT"53282"
17 PRINT"53283"
18 PRINT"53284"
20 FOR I=0T063
20 POKE1030+I,1
40 POKE1110+I,I+64
50 POKE1190+I,I+128
60 POKE1270+I,I+192
70 NEXT
80 GETA$:IFA$=""THEN80
90 POKE53265,PEEK(53265)OR64
100 GETA$:IFA$=""THEN100
110 IFA$=""THENA=A+1AND15:FOR I=0T0309:POKE55296+I,A:NEXT
120 IFA$="0"THENPOKE53281,PEEK(53281)+1AND15:REM F1
130 IFA$="A"THENPOKE53282,PEEK(53282)+1AND15:REM F3
140 IFA$="B"THENPOKE53283,PEEK(53283)+1AND15:REM F5
150 IFA$="C"THENPOKE53284,PEEK(53284)+1AND15:REM F7
160 GOTO100
  
```

extended background mode is enabled, and the four blocks become the same (to look at). They may be different colours. Looking at lines 30-60, you should be able to see a pattern. The quarter of the character set the character is in determines its background colour. Lines 110-160 wait for the space bar of F1-F7 and change a colour accordingly. By using the screen and the listing, the operation of extended background will soon become apparent.

## Video bank switching

The video interface chip (VIC) can work only with 16K at a time, and knowing how to select which 16K it looks at is necessary when using, for example, very long BASIC programs, or several character sets. All the examples so far have used bank 0 (0-16383) as the viewed bank. But what if your program extends to location 17000 in memory? You can't use bank 0 because any characters would be made up of numbers that make up the program (you could insert a character set in a program by changing line pointers, but that is only a "flash" way of doing it and is not really practical).

The answer is to put your character set in any region above 17000. The second bank the video ROM looks at starts at 16384 (256\*64), and you treat this bank exactly the same as the first — character sets start at multiples of 2048, and sprites start at multiples of 64. The addresses available for character sets are therefore 16384,18432,20480,

(Continued on page 59)

# commodore

The Market Leader  
does it First Again!

Now Every Home, Business and  
School can afford a Real Computer!

*Look at these New Top Value Prices!*

| commodore  | OLD PRICE | NEW PRICE | SCHOOL PRICE |
|--|-----------|-----------|--------------|
| C16 COMPUTER   | \$395     | \$295     | \$270        |
| C16 PACK<br><small>INCLUDES C16, DATASETTE,<br/>GAMES, SOFTWARE</small>  | \$495     | \$349     | \$320        |
| C64 COMPUTER   | \$695     | \$495     | \$450        |
| C64 PACK<br><small>INCLUDES C64, DATASETTE,<br/>GAMES AND EDUCATIONAL<br/>SOFTWARE, BOOK.</small>                                | \$795     | \$549     | \$500        |
| 1541 DISK DRIVE  | \$749     | \$485     | \$440        |
| STAR 5610C<br>PRINTER <small>NEAR<br/>LETTER QUALITY</small><br><small>INCLUDES FREE PRINT SHIP!<br/>(RETAIL VALUE \$90)</small> | \$995     | \$895     | \$814        |
| 803 <small>DOT MATRIX<br/>PRINTER</small>  | \$549     | \$399     | \$363        |

COMMODORE COMPUTER (NZ) LTD  
P.O. BOX 33.847 TAKAPUNA  
AUCKLAND. PH. 410-9182

**YES!** PLEASE SEND MORE  
INFORMATION ON

- C16 COMPUTER     EDUCATIONAL PROGRAMMES  
 C64 COMPUTER     SMALL BUSINESS SYSTEMS  
 PRINTERS         SOFTWARE PROGRAMMES

Theres a Commodore Dealer Near You!

 **commodore**

NAME .....

ADDRESS .....

.....

.....

(Continued from page 57)

22528,24576,26624,28672, and  
30720, and those for sprites  
16384+(page\*64).

To access a video bank other than the default bank, use the tables on pp 101-105 of the user manual. As an example, say you want to use a character set starting at 22528. The bank controlling locations are: 648,53272,56576 and 56578.

648 needs to be POKEd with the location of the screen/256. Assume that in this example, the screen is put at the start of bank 1, in the same relative position it occupies in bank 0. When you switch your machine on, the screen occupies 1024 to 2023. Now we will shift the screen so that it occupies (16384+1024) to (16384+2023), 17408 to 18407. 648 is therefore POKEd with 17408/256=68. If you don't do this POKE, you can't do any editing. The next POKE concerns the actual bank change, using locations 56576 and 56578.

First, make sure bits 0 and 1 of 56578 are set to 1, then POKE 56576 with the new bank code, like this:  
POKE56578,PEEK(56578)OR3  
POKE56576,(PEEK(56576)AND252)OR A  
where A = (3-bank)

Next the location of the character set must be put into 53272. POKE the low nybble with ((address-(bank\*16384))/1024). In our example, it works out this way: ((22528-(1\*16384))/1024)=6. The 6 is what goes into the low nybble of 53272. POKE53272, (PEEK(53272)AND240)OR6. The "AND240" is to maintain the value of the high nybble.

The screen position must now be set, in a similar fashion to the character set position. The high nybble of 53272 is the target for this operation. The formula is POKE53272,(PEEK(53272)AND15)ORA where A = (screen location-(bank \* 16384))/64

In this example, it works out as (17408-(1\*16384))/64 = 16

The total package for putting the screen at 17408, and using a character set at 22528 is:

```
POKE56578,PEEK(56578)OR3
POKE56576,(PEEK(56576)
AND252)OR2
POKE648,68
POKE53272,(PEEK(53272)
AND240)OR16
POKE53272,(PEEK(53272)
AND15)OR6
```

If you type all of these in, STOP /RESTORE,POKE648,4 will get you out of it. Note that when you move the screen, the sprite pointers go with it. In this example, they now reside at (16384+2040) to (16384+2047) = 18424 to 18431. Run this small program and it should make things clearer. It will also give you a reference on which to experiment.

```
10 POKE56334,PEEK(56334)AND254:POKE1,PEEK(1)AND251
20 FOR I=0TO1023:POKE22528+I,PEEK(53248+I):NEXT
30 POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
40 POKE648,68
50 POKE53272,(PEEK(53272)AND240)OR6
60 POKE53272,(PEEK(53272)AND15)OR16
70 POKE56578,PEEK(56578)OR3
80 POKE56576,(PEEK(56576)AND252)OR2
90 V=53248:POKE18424,192
100 POKEV,160:POKEV+1,160:POKEV+2,1:POKEV+39,1
110 SS=16384+192*64
120 FOR I=SSTOSS+63:POKEI,255:NEXT
130 PRINTCHR$(147):LIST
```

## Entrepreneur game

A management simulation game called Entrepreneur (from Microsoft), which tracks the business statistics of a software company, is being aimed by Paxus at people with experience in business as well as management hopefuls who aspire to run their own companies. It is particularly useful for those interested in software development and marketing.

## Extensive software

Skellerup Microsystems Ltd, the Christchurch-based software house, offers a range of software it claims constitutes the largest repertoire of interactive multi-user business software available — supplying more than 80 models of computers, from IBM PCs to ATIT's BB5 mini.



# MICRO SOFTWARE HIRE CLUB

OPEN WEEKDAYS & SATURDAY MORNINGS

## Commodore VIC20 & 64 – AMSTRAD ATARI – BBC – SPECTRUM – ELECTRON

☆☆ BRANCHES ☆☆

|   |   |   |
|---|---|---|
| <p><b>AUCKLAND</b><br/>C.B. CENTRE PH 444-8063<br/>15A Porana Rd. Takapuna<br/>THE COMPUTER TERMINAL PH 419-0543<br/>257 Hinemoa St., Birkenhead<br/>ABACUS VIDEO CENTRE PH 864-151<br/>16 New Bond St., Kingsland<br/>K ROAD COMPUTERS PH 399-655<br/>65 Piji Street</p> <p><b>ROTORUA</b><br/>CHANNEL FIVE PH 89-164<br/>87 Fenton Street</p> <p><b>NORTHLAND</b><br/>GARNET KEENE PH 84-999<br/>36-40 Rathbone St., Whangarei</p> <p><b>TAUPO</b><br/>Kiwi Computer Services<br/>C/- Terrys Tyre Services<br/>Runanga Street<br/>Taupo Ph (074) 83-028</p> | <p><b>WAIKATO</b><br/>COMPUTER ROOM LTD. PH 437-876<br/>177 Ward St., Hamilton</p> <p><b>GISBORNE</b><br/>PERSONAL &amp; BUSINESS COMPUTERS LTD<br/>PH 88-256 115 Gladstone Road</p> <p><b>NEW PLYMOUTH</b><br/>TRIO BUSINESS CENTRE LTD PH 85-226<br/>635 Devon Road</p> <p><b>TOKOROA</b><br/>AUDIO HI-FI SERVICES LTD. PH 68-922<br/>Dreghorn Place</p> <p><b>HAWKES BAY</b><br/>COMPUTER CONNECTION PH 51-965<br/>18 Dalton St., Napier</p> <p><b>GREYMOUTH</b><br/>Centrepoint Records<br/>Mackay Street<br/>Greymouth Ph 5956</p> | <p><b>NORTH ISLAND</b><br/>Kiwi Computer Services<br/>P.O. Box 822<br/>Taupo Ph (074) 83-028</p> <p><b>SOUTH ISLAND</b><br/>Centrepoint Records<br/>Mackay Street<br/>Greymouth Ph 5956</p> |
|---|---|---|

☆☆ Trade enquiries welcome ☆☆  
A Branch Franchise may be available in your area.  
Please Contact Phone 444-8063 or write  
Box 33-196 Takapuna, Auckland.

# AMSTRAD SOFTWARE AVAILABLE FROM YOUR AMSTRAD STOCKIST

In just eight short months Amstrad have available one of New Zealand's most comprehensive ranges of hardware and software. Written by the UK's major software companies you can be assured of the best available disc drive and cassette software.

Talk to your Amstrad stockist soon and check out the range.

| PRODUCT                                    | CODE | PRODUCT                             | CODE | PRODUCT   | CODE | PRODUCT                                  | CODE |
|--|------|-------------------------------------|------|---|------|--|------|
| <b>AMSTRAD EDUCATIONAL SOFTWARE (TAPE)</b> |      | Classic Adventure                   | 4371 | The Scout Steps Out   | 4515 | Entrepreneur                             | 4456 |
| World Hang                                 | 4312 | Snooker                             | 4372 | Airwolf   | 4516 | Stock Control/Sales Invoice/Ledger       | 4457 |
| Happy Numbers                              | 4313 | Roland Ahoj                         | 4373 | Grand Prix Rally  | 4517 | Purchase Ledger                          | 4458 |
| World Wise                                 | 4314 | Bridge It                           | 4374 | Subterranean Striker  | 4518 | Nominal Ledger                           | 4459 |
| Animal, Vegetable, Mineral                 | 4315 | Fruit Machine                       | 4375 | Lords Of Midnight   | 4519 | Mastercalc                               | 4460 |
| Happy Letters                              | 4316 | Muttant Mounty                      | 4376 | 3D Grand Prix   | 4520 | Transact                                 | 4465 |
| Happy Writing                              | 4317 | Loopy Laundry                       | 4377 | Zaxon   | 4521 | Invostat                                 | 4466 |
| Time Man One                               | 4318 | Dragons Gold                        | 4378 | Buck Rogers   | 4522 | DFM Database                             | 4467 |
| Time Man Two                               | 4319 | Centre Court                        | 4379 | Congo Bongo   | 4523 | Cashbook Account                         | 4468 |
| Map Rally                                  | 4320 | Classic Racing                      | 4380 | Tapper  | 4524 | Stock Aid                                | 4469 |
| Screen Designer                            | 4321 | Detective                           | 4381 | Spy Hunter  | 4525 | Devpac Assembler/Disassembler            | 4470 |
| Pitmans Typing Tutor                       | 4322 | Blagger                             | 4382 | Jump Set  | 4526 | Pascal                                   | 4472 |
|  |      | Splat                               | 4383 |   |      | Fourth                                   | 4473 |
| <b>AMSTRAD GAME SOFTWARE (TAPE)</b>        |      | Tapper                              | 4524 | <b>AMSTRAD SOFTWARE (VARIOUS TAPE)</b>                                  |      | Screen Designer                          | 4474 |
| The Key Factor                             | 4324 | Spy Hunter                          | 4525 | Flight Path   | 4436 | Home Account Manager                     | 4475 |
| Stockmarket                                | 4325 |                                     |      | House Of Usher  | 4437 | Basic Compiler                           | 4476 |
| Frank-N-Stein                              | 4326 | <b>AMSTRAD GAME SOFTWARE (DISK)</b> |      | Survivor  | 4438 |  |      |
| Jammin                                     | 4327 | Grand Prix Rally                    | 4600 | Alien   | 4442 | <b>AMSTRAD SOFTWARE (VARIOUS DISK)</b>   |      |
| Roland In Space (Speech)                   | 4328 | Subterranean Striker                | 4601 | Moon Buggy  | 4443 | Flight Path & Atom Smasher               | 4461 |
| Traffic                                    | 4329 | Lords Of Midnight                   | 4602 | Sorcery   | 4444 | House Of Usher &                         |      |
| See Saw                                    | 4330 | 3D Grand Prix                       | 4603 | Gate Crasher  | 4445 | Alien Break In                           | 4462 |
| Gun Dogs                                   | 4331 | Sorcery                             | 4604 | Alex Higgins Pool (W/Speech)  | 4446 | Survivor & Atom Smasher                  | 4463 |
| Star Eggs                                  | 4332 | Beach Head                          | 4605 | Dragons   | 4447 | Moon Buggy & Alien Break In              | 4464 |
| Bird Mother                                | 4333 | Raid Over Moscow                    | 4606 |   |      |  |      |
| The Prize                                  | 4334 | Bruce Lee                           | 4607 | <b>AMSTRAD TUTORIAL, BUSINESS &amp; HOME MANAGEMENT PROGRAMS (TAPE)</b> |      | <b>AMSTRAD BOOKS &amp; MISCELLANEOUS</b> |      |
| Brax Bluff                                 | 4335 | Zaxon                               | 4608 | Basic Part I  | 4384 | Concise Basic Spec                       | 4400 |
| Home Runner                                | 4336 | Buck Rogers                         | 4609 | Basic Part II   | 4385 | Concise Firmware Spec                    | 4401 |
| Grand Prix                                 | 4337 | Gongo Bongo                         | 4610 | Devac Assembler/Disassembler  | 4386 | Guide To CPM                             | 4402 |
| Harrier Attack                             | 4338 | Tapper                              | 4611 | Home Budget   | 4387 | Guide To Logo                            | 4403 |
| Sultans Maze                               | 4339 | Spy Hunter                          | 4612 | Amscalc Spreadsheet   | 4388 | Instruction Manual                       | 4404 |
| Spanner Man                                | 4340 | Cyruss Chess                        | 4613 | Amsword Word Processor  | 4389 | CPC464 Ring Binder                       | 4405 |
| Oh Mummy                                   | 4341 | Stockmarket                         | 4614 | Hisoft Pascal   | 4390 | Amstrad Computing                        | 4406 |
| Roland In The Cave                         | 4342 | Splat                               | 4615 | Amsword Advanced  | 4391 | Sensational Games                        | 4407 |
| Roland On The Rope                         | 4343 | Jammin                              | 4616 | Mastercalc  | 4392 | 40 Educational Games                     | 4408 |
| Gems Of Stradus                            | 4344 | Centre Court                        | 4617 | Tasword Word Processor  | 4393 | Amstrad Micro                            | 4409 |
| Chess                                      | 4345 | Muttant Mounty                      | 4618 | Masterfile  | 4424 | Computer Challenges For                  |      |
| Laser Warp                                 | 4346 | Roland In Space (W/Speech)          | 4619 | Project Planner   | 4425 | Amstrad                                  | 4410 |
| Haunted Hedges                             | 4347 | Fantastic Voyage                    | 4620 | Entrepreneur  | 4426 | Advanced User Guide                      | 4411 |
| Codename Mat                               | 4348 | Super Pipeline                      | 4621 | Decision Maker  | 4427 | Intro To Programming                     | 4412 |
| Xanagrams                                  | 4349 | The Scout Steps Out                 | 4622 | DFM Database  | 4428 | Exploring Adventures                     | 4413 |
| Hunter Killer                              | 4350 | Airwolf                             | 4623 | Home Account Manager  | 4429 | Amstrad Program Book                     | 4414 |
| 3-D Invaders                               | 4351 | Traffic                             | 4624 | Mastercalc  | 4430 | The Working Amstrad                      | 4415 |
| Alien Break-In                             | 4352 | See Saw                             | 4625 | Invostat  | 4431 | 60 Programs                              | 4416 |
| Atom Smasher                               | 4353 | Gun Dogs                            | 4626 | Transact  | 4432 | DDI Firmware                             | 4419 |
| Electro Freddy                             | 4354 | Star Eggs                           | 4627 | Stock Aid   | 4433 | Guide To CPM                             | 4420 |
| Admiral Graf Spee                          | 4355 | Bird Mother                         | 4628 | Fourth  | 4434 | Amstrad Magic                            | 4421 |
| Star Command                               | 4356 | World Cup Soccer                    | 4629 | Introducing Pascal  | 4435 |  |      |
| Crazy Golf                                 | 4357 | Pyjama Rama                         | 4630 |   |      | <b>ALPHA LINK SERIES (DISK)</b>          |      |
| Punch                                      | 4358 | Brax Bluff                          | 4631 | <b>AMSTRAD TUTORIAL, BUSINESS &amp; HOME MANAGEMENT PROGRAMS (DISK)</b> |      | Accounts Receivable                      | 4701 |
| Roland Goes Square Bashing                 | 4359 | Alien                               | 4632 | Microscript   | 4448 | Accounts Payable                         | 4702 |
| Pyjama Rama                                | 4360 | Alex Higgins Pool (Speech)          | 4633 | Micro Pen   | 4449 | Cashbook                                 | 4703 |
| Cubit                                      | 4361 | Dragons                             | 4634 | Microspread   | 4450 | Stock Control/Invoicing/Cash Sale        | 4704 |
| Roland Goes Digging                        | 4362 | Fu Kung In Las Vegas                | 4635 | Amsword Advanced  | 4451 | Job Costing/Stock Control/Invoicing      | 4705 |
| Roland In Time                             | 4363 | Gate Crasher                        | 4637 | Masterfile  | 4452 | Import Costing/Stock Control/Invoice     | 4706 |
| Space Hawks                                | 4364 | Pitmans Typing Tutor                | 4638 | Project Planner   | 4453 | Club Membership                          | 4707 |
| Amsgolf                                    | 4365 |                                     |      | Decision Maker  | 4454 | Cash Register                            | 4708 |
| Galactic Plague                            | 4366 | <b>AMSTRAD GAME SOFTWARE (TAPE)</b> |      | Star Watcher  | 4455 |  |      |
| Roland On The Run                          | 4367 | Fu Kung In Las Vegas                | 4512 |   |      |  |      |
| Manic Miner                                | 4368 | Fantastic Voyage                    | 4513 |   |      |  |      |
| Astro Attack                               | 4369 | Super Pipeline                      | 4514 |   |      |  |      |
| Quack A Jack                               | 4370 |                                     |      |   |      |  |      |



Grandstand Computers Ltd,  
C.P.O. Box 2353, Auckland,  
21 Great South Road,  
Newmarket,  
Auckland.  
Ph: 504-033.

## GRANDSTAND AMSTRAD

## The Amstrad 6128

## The Z-80's Finale?

by Peter Biggs

*Amstrad has just released its answer to the US move to 128K home and business computers – the Amstrad 6128 – and it was here in NZ only 10 days after its launch in the UK!*

*My own experience has been through the Sinclair range to the BBC Micro and now to MSDOS with some passing usage of CP/M on the way. I remember the days when 16K was 'real big', playing StarTrek (the best version I've seen to date) on a TRS80 and a very adequate game of chess on my old ZX81. 128K wasn't even a dream then.*

Now ... big memory is in for 1985/86.

Why all this extra memory? After all, the 8-bit chip only addresses 64K and BASIC can usually only be written in this space minus the operating system.

The answer is simple. It's aimed at the small business and more sophisticated home user to give them access to the vast library of software, both commercial and public domain, through the CP/M operating system.

Educationally, it could also be useful as it would give students experience of the kind of small computer operating systems found in businesses around the country.

## Sleek machine

Now to the machine itself. Sleek and subdued, the 6128 looks a very professional computer with a 'business-like' finish. The entire system is manufactured in South Korea by a Japanese company and its looks 'quality'.

It comes with a green screen or colour option, with the green screen definitely preferred for WP (Word Processing) and business applications.

The keyboard is shorter and thinner with the disc drive lower than on the 664. It has light grey keys contained in a dark grey plastic casing (I liked the brightly coloured keys of the 664), a master key chart and a screen colour chart on the disc drive.

It has a 10 function keypad/numeric combined keypad with the Return and Enter keys smaller than on the 664. The Cursor keys are arranged in an upside-down 'T' shape. It has a good keyboard feel, although not ideal for WP but more than adequate.

The 6128, like the 664, uses a 3-inch single-sided disc drive using discs manufactured by Hitachi. They hold a respectable 180 K/side on 40 tracks. "Why not 3.5 inch, the industry standard?" I hear you say. No answer.

The 6128 plugs together the same as the 664, the three wires being only just long enough to place the monitor above the computer.

There are plenty of I/O ports – a second drive, stereo, cassette, parallel printer, joystick, expansion but no RS232.

A number of peripherals are available – a dot matrix printer, a joystick, a light pen, a voice synthesiser and a TV modulator if you retreat to using it on a TV. No Graphics Table, Plotter or Mouse yet.

An RS232C interface, complete with Prestel software in ROM, is available and is needed for the Modem. The Modem, built here by Fountain Industries, is P.O. approved.

I found of great interest a ROM holder box fitting 7 ROMs. Undoubtedly software will become available for these ... after using a BBC, I found ROM software the way to go for software used frequently.

## Bank-switched

The 6128 is based around the Z-80A processor running at 4 MHz, with 128K RAM of which 64K is bank-switched and the entire operating system held in a 48K ROM. This contains the BASIC interpreter and the Operating System which are held in 32K and the remaining 16K contains AMSDOS and a small part of CP/M. 27K of this is held in the second bank.

Amstrad BASIC switches ROM and RAM out of the same memory space giving users 43K (out of 64K) of BASIC space to play with. The extra 21K of ROM use up the screen memory and operating system.

The BASIC is Locomotive BASIC, supporting interrupts directly from BASIC – Every and After – and facilities for defining up to 8 text windows. It's a full BASIC with the extra 64K operating as a RAMDISK, storing screen images and data using a program called Bank Manager (supplied).

You cannot write bigger programs but you can access string data (using Bankwrite, Bankread, Bankfind) or screen maps (using Screenswap and Screencopy) from the extra memory. These commands simply copy 16K blocks of screen data in and out of the video RAM area. Up to four additional screens can be sorted but displaying them can take about half a second.

The graphics and sound are excellent. Sound is via the MSX standard AY-3-8192 chip, using an interrupt and

queuing technique which is very easy to control and the Envelopes are peculiar but versatile, and they work.

The graphics can display up to 16 colours from a palette of 27 in the lowest resolution mode 160 x 200. The highest resolution is 640 x 200 or 80 col x 40 rows of text.

## No abbrev.s

I found it annoying that there is no abbreviation for commands or keywords but maybe I've been spoilt with the BBC Micro. Upper and lower case variables are the same so be careful of reserved words. The manual supplied with the computer is excellent but contains little of CP/M.

There are two Disc Operating Systems (DOS) with the 6128, AMSDOS and CP/M. In all cases, I found disc access times satisfactory.

AMSDOS is Amstrad's own DOS, which services BASIC, but disc servicing such as formatting, backing up and copying files is all run from CP/M.

AMSDOS itself was born from the cassette OS on the 464 and is barely suitable for discs. It does not support random-access files for instance and the other disc commands are enough but limited.

64K can only support CP/M 2.2 but with 128K, the more sophisticated version CP/M Plus (CP/M 3.1) is possible ... and the 6128 comes with both. Also, to make CP/M software modification easy, Amstrad have configured the 6128 as a VT-52 terminal, an industry standard. With CP/M Plus, 61k is available as TPA.

## Why CP/M?

Why CP/M? Because it's been around longest (since 1968) and there is a vast amount of commercial software (eg. Wordstar, dBase II) as well as free software from CP/M User Groups around the world.

About 10% of it would be very useful but the average home user will probably not be interested.

CP/M Plus comes with all the usual CP/M utilities as well as GSX, the Graphics Extension that allows dumping screens to a printer. The CP/M is in 8080 code rather than Z80 but this should not affect most software.

The CP/M Library contains a large number of useful utilities and assorted software, usually not useful to the beginner but definitely useful further on.

Virtually all computer languages (such as Pascal, Turbo Pascal, C, Pilot, LISP) are available through CP/M.

As CP/M is used for business software it could give schools and others a chance to get their feet wet on a com-

(Continued on page 62)

## Hardware Review

(Continued from page 61)

mercial OS that provides a good introduction to MSDOS.

Again, with the extra memory, the full implementation of Digital Research LOGO is possible and it comes supplied as the reduced 64K version. The commands are well documented in the manual.

The only two niggles I have are that the extra 64K should have been able to have been used for BASIC program space and that the drive is only single sided with 180K. This is unsatisfactory for CP/M.

The major fault is that AmsDOS does not allow random access filing, a sin unworthy of this otherwise superb machine.

### Comparisons

Comparing the 6128 to other computers around, the Commodore 128, due to be released here around the beginning of November, allows the extra memory to be used to store programs and variables as well.

As the Commodore 128 has access to the vast store of games and utilities written for the Commodore 64, it would still be the computer if you wanted to just play games.

However, look at the cost of adding a colour monitor and a disc drive and you'll see the difference – about \$1000.

The BBC Micro has always suffered from memory constraints although the recently released version now has 32K for programs in any mode. The 6128 has a lot more memory but the BBC Basic with Procedures is easier to use and leads to better structured programming. As a 6502 processor-based computer, it cannot run CP/M.

There is a wealth of educational software for the Beeb, and its DOS is better than AmsDos.

But again, the price difference is over \$1000.

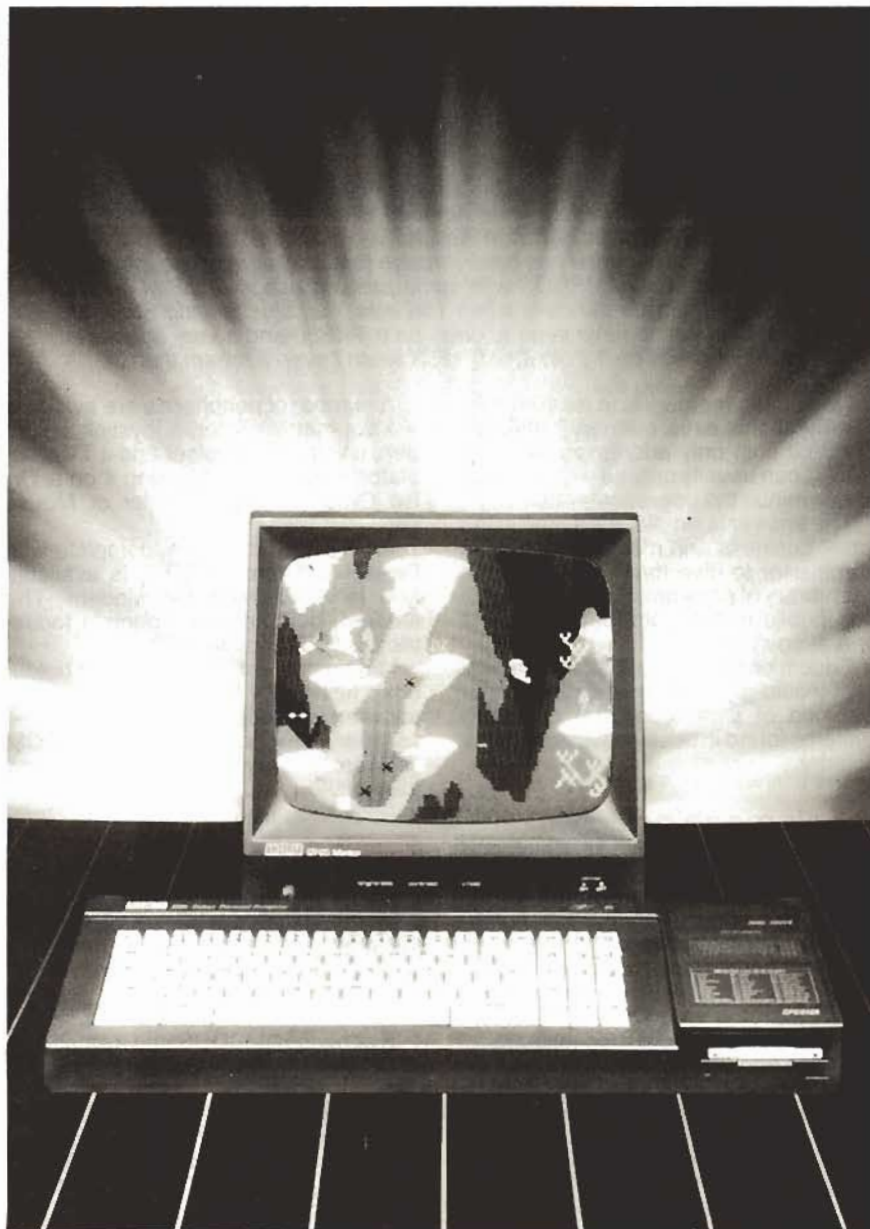
(PS they say 'Elite' will be available for the Amstrad Real Soon Now!)

Other contenders for the small business market running CP/M are the Bondwell 14, Osborne Vixen and others. For myself, I would keep an Amstrad green screen at work and a colour screen at home and simply move the computer!

### Needs database

Now to software. I have seen some exceptional games, all well priced, such as Sorcery, Beachhead and Ghostbusters – as well as a Wordstar-like (improved to my way of thinking) word processor called Amsword and a satisfactory spreadsheet called Mastercalc.

It needs a good database, an art and design package such as CadPic and an



---

### Is this the end of the track for 8-bit micros?

---

integrated 'Appleworks-like' program including icons to complete the full circle.

As Amstrad is one of the three top selling micros in the UK we should see plenty of software pouring out for it soon.

I confess to being impressed. What this machine has got is price, function

and compactness. It's all there in two neat packages.

Overall, it is good value for money, well supported, and software and peripherals are reasonably priced.

The 6128 brings a colour monitor and disc system to the home and small-business user for under \$2000.

A small-businessperson could buy the machine and get started right away in WP or a spreadsheet, then pick it up (its light and easy to carry) and take it home at night for the kids.

A final thought: This seems to be the end of the track as far as 8-bit computers go. I am sure we will soon see 16-bit

MSDOS home computers on the market but the problems will remain the same – lack of software and broken promises.

As far as I can see, the 6128 would place any home user in a good position – in fact, most users would never reach the end of their machine. Besides there is now a lost of expertise and software around for 8-bit 6502 and Z80 chips and you could learn a lot on this one.

I'm still waiting for gigabyte bubble RAM chips addressed by two 32 bit co-processors, wafer disc drives and a flat hi-res colour screen. Dream on ...

### Dick Smith goes U.S.

One company familiar to NZ readers that has just become established in Silicon Valley is Dick Smith Electronics.

It opened its first store here three months ago and now has three, although it is not selling computers yet – only peripherals and electronics products.

Marketing vice president is David Milson, who had headed Dick Smith's NZ operations before being transferred to the US.

## MICROCOMPUTER SUMMARY

|                           |  |
|---------------------------|--|
| <b>Name:</b>              | CPC 6128   |
| <b>Manufacturer:</b>      | Amstrad Consumer Electronics Plc   |
| <b>Processor:</b>         | 8 bit Z80A   |
| <b>Clock speed:</b>       | 4 MHz  |
| <b>RAM:</b>               | 128K arranged in two 64K banks. 41K available for user BASIC, 61K TPA to CP/M Plus.<br>No expansions available yet.  |
| <b>Input/Output:</b>      | Keyboard, cassette, stereo, joystick, centronics parallel, a second disc drive, and expansion ports.<br>Volume control on internal speaker.                        |
| <b>Keyboard:</b>          | 74 keys, qwerty style, keypad/function keys cluster, T style cursor keys. All keys may be user-defined using up to 120 characters.                                 |
| <b>Display:</b>           | Green or colour monitor option. 224 character set, 3 graphics/text modes. Max. 80 x 25 line display. Full international character set under CP/M Plus.             |
| <b>Graphics:</b>          | 640 x 200 max. pixel density.<br>Display max. 16 out of 27 colours.  |
| <b>Operating systems:</b> | AmsDOS (native support for Locomotive BASIC), CP/M 2.2 and Plus.   |
| <b>Languages:</b>         | Locomotive BASIC (in ROM), DR LOGO (supplied), others available through CP/M.  |
| <b>Sound:</b>             | 3 channels over 8 octaves, each independently variable.  |
| <b>Cost:</b>              | Computer with green screen \$1595.<br>With colour display \$1995.<br>Note: display contains power supply for computer and drive                                    |
| <b>Options:</b>           | Second disk drive, joystick, printer, voice synthesiser (with stereo speakers), RS232C serial interface (with Prestel ROM software), modem, TV Modulator, ROM Box. |
| <b>Software:</b>          | BASIC in ROM. Two Discs supplied with CP/M 2.2 and CP/M Plus (with all utilities), DR LOGO (for 2.2 and Plus), other disc routines for copying, formatting etc.    |
| <b>NZ Distributor:</b>    | Grandstand Electronics Ltd, Auckland.  |

# BREAKING BARRIERS

## POLY 2 LEARNING SYSTEM



**BREAKING THE LEARNING BARRIERS**— Across all levels of Education and Training

**BREAKING THE TECHNOLOGY BARRIERS**— Being able to create your own courseware without specific computing skills

**BREAKING THE COST BARRIERS**— The combination of technical superiority and cost efficiency, delivering maximum return to its Users

Manufactured in New Zealand and guaranteed by POLYCORP New Zealand Limited, a division of PROGENI.

For further information Write or Call -  
**Katharine Moody**  
 PO Box 30243  
 Lower Hutt  
 Ph 666014

**Alan Depree**  
 PO Box 5420  
 Auckland  
 Ph 796977

**John Gale**  
 PO Box 13027  
 Christchurch  
 Ph 795453

# POWERFUL, FLEXIBLE A NEW BREED OF

Microcomputer technology moves fast. The latest application software, with its increasing dependence on visual communication, is outpacing the processing and graphics facilities of first generation 16-bit systems.

Nimbus from Research Machines provides the needed breakthrough in performance and graphics now and for the future at an affordable price. And at the same time, maintains maximum flexibility and capacity for expansion.

## POWER

Nimbus is probably the most advanced computer in its price range. It evolves from a completely original design concept incorporating VLSI technology, dual bus architecture and a separate RM-designed graphics processor.

Together with the use of the 80186 8MHz processor, this makes Nimbus two to three times faster than most competing systems.

The 8051 11MHz peripheral control processor enables the most ambitious interfacing needs to be met.

Direct memory access allows your disk access to run in parallel with other kinds of I/O and support high speed network operation.

Dual bus architecture ensures that graphics and internal memory needs do not slow each other down.

The 8087 8MHz hardware floating point option will satisfy any needs for very demanding numerical processing.

## GRAPHICS

User-friendly is an over-used word, but given the choice, most users, whether beginners or experts, prefer to drive their computer with graphics-oriented facilities.

The trend towards easier to use, quicker to learn, more attractive application software (with mixed graphics and text, colour, multiple fonts, mouse and cursor control, windowing and sprites) requires



bit-mapped display and high resolution. All these features are provided by the RM-designed graphics processor together with an order of magnitude increase in speed.

## MODULARITY

You can adapt your Nimbus computer to almost any purpose today or tomorrow. The Nimbus comes with a standard 576K of internal memory (including a separate 64K for graphics) which is expandable up to a megabyte.

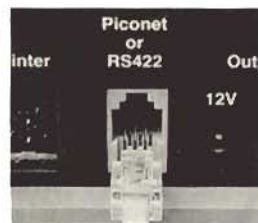
There are also system ROMs, a configuration EEROM, and — optionally — one or two ROM cartridges.

The flexible, easily upgradeable

design allows users the choice between the following Nimbus internal disk configurations:

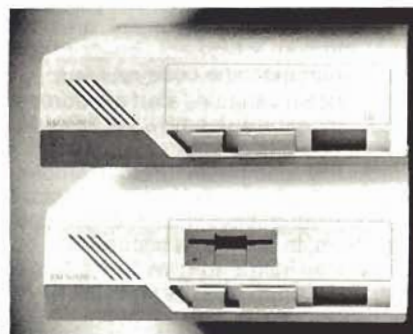
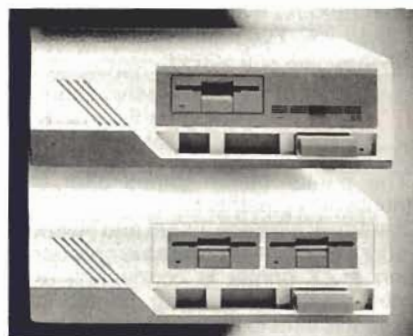
- single 3.5" drive
- twin 3.5" drives
- single 3.5" drive + 10 or 20 Mb Winchester.
- without drives (as a station on the network).

And for even higher storage capacity external high-speed 40 and 80 Mb. Winchester disk drives will be available together with optional cartridge tape backup.





# ABLE, AFFORDABLE. MICROCOMPUTER.



## INTERFACING

A computer's abilities are virtually unlimited if they are supplemented with the right professional tools.

Control modules, data logging instruments, sound, music and graphics devices — every kind of technical or scientific application — can in theory be linked to a microcomputer. But few micros are designed to be able to cope with more than a small number of these interfaces.

Among the many totally new ideas incorporated in Nimbus is Piconet, a unique input-output system which allows the computer to drive up to thirty peripherals, instruments or devices from a single I/O port.

As well as Piconet, Nimbus provides a complete array of

standard I/O facilities and four general purpose internal expansion slots. In fact there are more interface options with Nimbus than you are ever likely to need.

## SOFTWARE

The MS-DOS\* and MS-NET\* operating system, together with other key design benefits ensure the user has access to a very large range of existing software, including the following:

- word processing
- spreadsheet
- administration
- accounts
- database
- communication
- office productivity
- languages
- graphics
- paintbrush
- CAD
- CAL
- entertainment

A 5 1/4" external disk drive is available for reading and writing files from IBM PC and other MS-DOS\* systems.

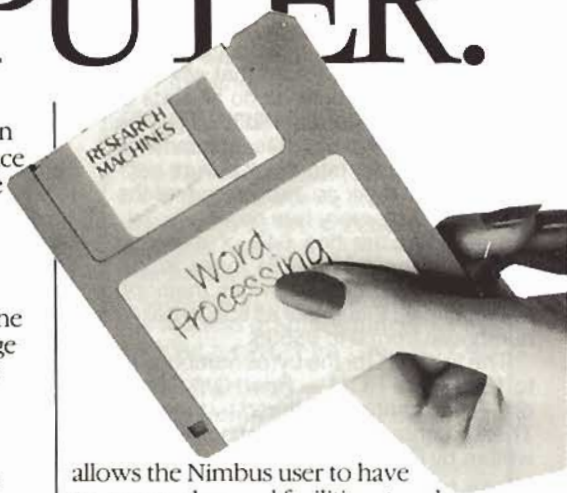
## NETWORKING

Networking is increasingly in demand in those computer installations where economy, efficient organisation and improved communications are essential.

RM's extensive experience in networking is now translated to 16-bit using MS-NET\* with our high-speed 0.8 Mbits/sec chain interconnection. This will allow up to 64 stations spread over up to 1200 metres to share network facilities, printers and software.

## DESIGN

Design is the key element which



allows the Nimbus user to have so many advanced facilities at such really low cost.

The Nimbus series is elegant functional and modular. User requirements have been taken into account from the most simple (very quiet fan, hand-grip slots for easy carrying) to the most far-reaching (1 megabyte memory expansion, Piconet multiple interface system, new graphics processor). Built-in expansion capacity is provided to handle most conceivable future developments.

Nimbus, with its custom-designed keyboard, has a small footprint which gives a total front-to-back system depth of about 56cms. Monitors can fit easily on the Nimbus units, which are themselves stackable.

**Barson Computers Limited**  
1 Ngaire Ave. Epsom. Box 26287 Auckland.  
Telephone 504-049.

# RM NIMBUS

**Barson Computers Limited**  
1 Ngaire Ave. Epsom. Box 26287 Auckland.  
Telephone 504-049.

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Company/University/Tech. Inst. \_\_\_\_\_

Position \_\_\_\_\_

TA2289

# A survey of memory

A few days ago a Spectrum Plus owner commented to me that while he could get his computer to do all sorts of interesting things by following the instructions given in this column, he didn't really understand what was happening. So I think an explanation of the Spectrum's memory is in order.

The Spectrum has 64K of memory, and since there are 1024 bytes in 1K, there are 65536 bytes in this memory. These can be thought of as 65536 boxes numbered from 0 to 65535.

The first 16K (or the bytes numbered 0 to 16383) are ROM — Read Only Memory — and cannot be altered by the user. These contain the operating system written by Sinclair to control the computer.

The next 48K (the bytes numbered 16384 to 65535) are RAM — Random Access Memory — and can be altered by the user. Most of this memory is used to hold program, but some of it is taken up by information used by the ROM.

These areas can be manipulated by the user to provide various effects.

## Screen memory

The first 7K or so of RAM (the bytes numbered 16384 to 23295) are taken up by screen memory. This area holds a representation of the screen picture in memory. Whenever you print something on the screen, a ROM routine puts it in to

this area of memory.

Every 50th of a second, this area of memory is transferred onto the screen, and in this way the picture is formed.

The first part of the screen memory is called the display file. This holds a representation of the dot pattern of the screen. Since the screen has 192 dots down and 256 dots across, this area contains 192 x 256 49152 bits. Each bit is set to 1 or 0, depending on whether the dot is black or white.

Since there are 8 bits per byte, 6144 bytes are necessary to hold information about every dot on the screen.

These bytes occupy addresses 16384 to 22527. Clear the screen, and POKE any address between 16384 and 22527 with 1. You'll see a dot on the screen.

## Colours

The last part of the screen memory is taken up by the attribute file, which controls the screen colours. Since the Spectrum can have two colours per character square, and there are 24 x 32 768 squares on the screen, there are only 768 bytes in the attribute file. Each byte holds information about one square.

The bytes are in one long list, but the screen is a grid of squares. How do the bytes represent these squares?

The order is pretty much as you would expect. Each 32 bytes represent one

line on the screen, and the next 32 bytes represent the next line down. So if you POKE an address in the attribute file (say 22550) with a random number (say 16) and then POKE another address 32 bytes along (22582) with another number (say 125) you'll get two coloured squares, one below the other.

Try writing a little program which will POKE random numbers into the whole attribute file. You'll end up with a multicoloured flashing screen.

## Other addresses

The printer buffer comes after the attribute file in memory.

It starts at address 23296 and finishes at address 23551. This area is only used when a ZX printer is connected, and stores whatever is being printed out before it is sent to the printer.

Since few people have ZX printers, the printer buffer is a useful area of empty memory which can be used for storing short machine code routines.

The system variables start at address 23552. These are used by the ROM to hold various bits of information used to control the computer. For example, address 23609 is called PIP, and controls how long keys beep when you press them, in 50ths of a second.

Try using POKE to give PIP a large number (say 200) and see what the keys sound like.

After the system variable come the microdrive maps, at address 23734. This area is empty unless you have microdrives connected, and varies in size when microdrives are being used. So all the other areas of memory after the microdrive maps move up and down in memory as well.

## Basic

The microdrive maps are followed by a short area of channel information, and then the Basic program.

The Basic program is any program written in Basic that you have typed in or loaded, and can be any length between a few bytes and about 41K in length, since you have about 41K of memory available once 7K is used by the screen memory and suchlike.

After the Basic program comes the variables. These are the variables used by the Basic program.

For example if you have a variable named C and you LET C 5, then just above your Basic program the variable C will be stored with its present value, 5. Every time you change the value of C, the computer begins at the start of the variables, and searches through memory until it finds a variable called C, and then alters the value stored with it.

**OFFICE  
ELECTRONICS  
LTD**

Your West Auckland agents for



**SANYO  
BUSINESS COMPUTERS**

**NEW PREMISES  
4 Waipareira Ave  
Henderson**

**NEW PHONES  
837-1362  
837-1363**

## November Selection

Following the variables are various bits and pieces of information used by the computer, for example a GOSUB stack which keeps track of where to return to when you go into a subroutine in a Basic program.

At the very top of memory the user defined graphics are stored. Normally this area of memory will contain bytes representing the letters A to U, because this is what the user defined graphics look like when you turn the computer on, but these bytes will be altered whenever you change the graphics.

So there it is, a survey of the 65536 bytes forming the Sinclair Spectrum computer.

You can alter these bytes as much as you like (using POKE) without harming the computer in any way, so feel free to try things out.

If you try to POKE ROM (that is, addresses below 16384) the computer will simply ignore you.

You might confuse the computer if you alter some of the system variables, so that it "locks up". If this happens, simply switch it off and on again to regain control.

If you're a Spectrum Plus owner, try to borrow an old Spectrum manual if you can get hold of one, since the old manual contains a lot more information about the internal workings of the Spectrum. It just hasn't got such pretty pictures.

If you want to know about a particular area of memory in more detail, check out past issues of Bits & Bytes.

If there's anything else about the Spectrum you'd like to read about, drop me a line at P.O. Box 4063 Christchurch.

## 'City Smasher'

Here's 'City Smasher' for the ZX Spectrum.

The program itself is original but the idea is not.

Instructions are included in the program and the graphics included in lines 9000-9070; these lines may be entered first so that the graphics may be entered as such in the main programme.

```

10 GO SUB 9000
20 GO SUB 7000
500 LET q=0: LET p=1: LET h=17:
LET b=15: LET x=1: LET y=0: LET
s=0
1550 LET m=0
1600 FOR g=0 TO 25
1010 FOR f=21 TO INT (RND*12)+6
STEP -1
1020 PRINT AT f,g: INK 1;"■"
1030 NEXT f
1040 NEXT g
1060 PRINT AT x,y: INK 0;"■"
1070 LET y=y+1: IF y=28 THEN PRINT
AT x,y:"": LET y=0: LET x=
x+1: IF x=22 THEN GO TO 2000
1071 IF ATTR (x,y+2)=57 THEN GO
TO 5000
1075 IF INKEY$="5" AND m=1 THEN
M GO TO 1001
1080 IF INKEY$="5" THEN LET x1=x
LET y1=y: PRINT AT x1,y1: INK
"■": LET m=1: BEEP .000,x1+1
END
1001 IF m=1 THEN PRINT AT x1,y
1
1005 IF m=1 THEN LET x1=x1+1:
IF x1=21 THEN LET m=0: PRINT AT
x1,y1:""
1006 IF m=1 THEN PRINT AT x1,y
1: INK 2;"■": IF ATTR (x1+1,y1)=
57 THEN LET s=s+1
1009 IF INKEY$="8" AND b>0 THEN
FOR o=1 TO 25-y: PRINT AT x,y+o+
1: INK 3:"-": BEEP .01,o-30: NE
XT o: LET b=b-1: PRINT AT x,y+1:"
"
1100 PRINT AT b,o:"SCORE";s;AT
o,16;"AMMO ";b;" ";AT o,25;"L ";
P
1200 GO TO 1050
2000 FOR g=0 TO 25
2100 FOR f=21 TO INT (RND*12)+6
STEP -1
2110 PRINT AT f,g: INK 1;"■"
2120 NEXT f
2130 NEXT g
2200 LET x=1: LET p=p+1: LET y=0
LET s=s+p: LET b=b+2: GO TO 10
60
5000 CLS
5010 FOR f=1 TO 100
5020 BORDER INT (RND*6)
5030 BEEP .01,f-50
5040 NEXT f
5050 FOR k=1 TO 5
5051 PRINT AT k+2,6;h$(k);" ";h (
k)
5052 NEXT k
5055 FOR k=1 TO 5
5060 IF s>h(k) THEN LET h(k)=s:

```

```

GO TO 6000
5051 NEXT k
5070 PRINT AT 15,0:"BAD LUCK, BE
TTER LUCK NEXT TIME"
5080 PRINT AT 21,5: FLASH 1: PAP
ER 0: INK 0:"Press any key to st
art": PAUSE 0: PAUSE 0: LET P=1:
LET b=15: LET s=0: LET x=1: LET
y=0: CLS: GO TO 1000
6000 PRINT AT 15,0:"YOU HAVE BEA
TEN";h$(1)
6010 INPUT "Your name please ";h
$(k)
6020 LET s=0: CLS: GO TO 5050
7000 CLS
7010 PRINT "CITY SMASHER"
7020 PRINT "USE KEYS 5 & 8 TO B
OMB AND FIRE"
7030 PRINT "RESPECTIVELY, ONCE T
HE CITY IS
7040 PRINT "DESTROYED YOU WILL
RECEIVE 2
7050 PRINT "MORE SHELLS, AND A
RECEIVE THE
7060 PRINT "PATTERN YOU ARE ON
AS A BONUS"
7070 PRINT AT 21,9:"PRESS ANY KE
Y": PAUSE 0: CLS: RETURN
9000 FOR f=USR "a" TO USR "e"+7
9010 READ a: POKE f,a
9020 NEXT f
9030 DATA 0,a,32,50,a,32,0,a
0,a,a,15,a,0,a,a
9050 DATA 255,153,a,255,a,153,a,
255
9060 DATA 40,112,120,127,a,a,53,
0
9070 DATA 0,a,240,252,254,a,252,
0
9075 DIM h$(5): DIM h(5)
9080 FOR g=1 TO 5
9090 READ h$(g): READ h(g)
9100 NEXT g
9110 RETURN
9120 DATA "UNCLE BULGAIER",1000
0,"NAUGHTY TED",2000,"FROSTY BOY
",1200,"TARCOON",800,"MINER WILL
Y",400
9998 ERASE "■":1:"city": CAT 1:
SAVE "PRINT1:"city" LINE 1: UERIF
Y "■":1:"city": CAT 1: STOP
9999 SAVE "city" LINE 1: VERIFY

```



"among the best  
Apple software  
available" -  
*Bits and Bytes*

- Graphics Editor  
- Spelling Checker  
- Twister Plot Story Teller - and  
more (for 64K Apple). See reviews  
in August and September issues  
of *Bits and Bytes*. Get an  
order form from your Apple dealer  
or write to Box 6186, Dunedin.

**otakou software**

## FRAMEWORK —

**An Introduction by Bill Harrison**  
This book is designed to show users how to take full advantage of the capabilities of Framework written with the novice computer user in mind. **\$39.90**

FRAMEWORK MADE EASIER  
by McIntyre/Granoff/Bishop

This handbook picks up where the users manual leaves off: Now you can maximise the synergistic benefit of having FRAMEWORK'S spreadsheet, wordprocessing data management, telecommunications and graphics functions working together for you. **\$37.40**

## FRAMEWORK —

## A Programmers Reference

This book shows you how to solve information problems at all levels of complexity. **\$62.40**

UNDERSTANDING AND  
USING MULTIPLAN by Krumm

Complete self-study approach to using multiplan, one of the most powerful spreadsheets available. It explains the logic behind multiplan — the way it works and why. **\$42.40**

PROGRAMMER'S GUIDE TO  
MS DOS FOR THE IBM PC  
by D.N. Jump

This book breaks through the complex technical descriptions of how microsoft MS-DOS operates and clearly explains and illustrates each concept as it is introduced. **\$39.90**

ILLUSTRATED MS-DOS-  
WORDSTAR HANDBOOK —

with Mailmerge and spellstar operations. by R.A. Stultz  
The author translates jargon into plain English and includes a description of each function its application and a typical operation providing exact key strokes. **\$37.40**

## UNIX AND XENIX

A step by step guide  
by Topham/Van Troung  
Written for those using 16 bit microcomputers, this text systematically covers the commands you'll need to know to operate in UNIX/XENIX. **\$54.90**

Order through your local bookseller, computer shop or Bits and Bytes. Wholesale terms available to trade outlets.

**DISTRIBUTED BY  
WHITEHALL BOOKS LIMITED  
P.O. Box 38-694, PETONE.**

# SAVE THOUSANDS

**olivetti**  
**M24**  
**BUSINESS PACKAGE**

**OPEN ACCESS**  
**software**  
**package**  
**FREE**



Look at what you get . . .

- 256K RAM
- 8086 CPU
- 8MHz clock
- IBM style keyboard
- Hi-Res green monitor
- Single 360K disk drive
- Parallel port
- Serial port

**PLUS** → **10 MEGABYTE HARD DISK DRIVE**

With the sheer speed of the Olivetti M24 and the power and performance of Open Access you'll make child's play of:

- **Spreadsheets** — 300 rows × 216 columns, 648,000 cell entries!
- **Information management** — relational database
- **Wordprocessing** — with graphics in text
- **Communications** — talk to the world or the computer on the next desk
- **Time management** — appointments, reminders, phone nos, note pad.
- **3-D graphics**

SUGGESTED RETAIL ~~\$12,595~~

**\$9995**

**SAVE \$2600**

Cat X-5219

NZ195.34

**Dick Smith Electronics**

**COMPUTER CITY**



• **AUCKLAND**  
 Downtown  
 Newmarket  
 Papatoetoe  
 Avondale

• **HAMILTON**  
 • **WELLINGTON**  
 • **LOWER HUTT**

• **CHRISTCHURCH**  
 • **DUNEDIN**

Cnr Fort & Commerce Sts, Ph: 38 9974

98 Carlton Gore Rd, Ph: 54 7744

26 East Tamaki Rd, Ph: 278 2355

1795 Great North Rd, Ph: 88 6696

450 Anglesea St, Ph: 39 4490

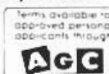
154 Featherstone St, Ph: 73 9858

440 Cuba St, Alicetown Ph: 66 2022

Cnr Victoria St & Bealey Ave., Ph: 50 405

Cnr Manse & Stafford Sts, Ph: 74 1096

DSXpress Mailorders -  
 Dick Smith Electronics  
 Private Bag, Newmarket.  
 (09) 54 9924



Want to know more about the Olivetti M24?  
 Send for your **FREE** information pack. It's obligation  
 free: no salesman will call.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ phone \_\_\_\_\_

Drop into any Dick Smith Electronics store or send  
 to DSXpress, Private Bag Newmarket, Auckland.

Tramiel on:

## Where's Atari heading?

Atari boss Jack Tramiel claims his bosses are "the people for whom I work to produce products for" ...meaning you and me.

That was why, he says, he took time out from the Summer Consumer Electronics Show at Chicago to "report" to a local user group on product development plans.

Excerpts of the report, reprinted in the October newsletter of Auckland's Tarland Computer Club, are presented below as direct quotes from Tramiel.

### On why Atari produced the 260STD (as well as the 520ST):

"We feel that there are different buyers in this marketplace...people who like to buy from K-Mart and people who like to buy from specialty stores, so we went ahead and designed two different kind of machines.

"There is the total system like the 520 which will be sold to specialty stores and a system like the 260 where the mass merchandiser, if he wants to, can buy it. It was strictly to be able to produce the volume and to satisfy our customers.

### On future products:

"We will definitely have new machines constantly. Our aim is to continuously improve the product line. We intend to show at Comdex this year an even higher graphic machine.

"We intend to keep the ST as the basic machine. What we will do is we intend to have an expansion box. In that expansion box we intend to put quite a few boards. One of those boards will be a 32-bit board. Not a machine, but just a board. It will turn the ST, which you own today, into a 32-bit machine if you want to.

### On stored memory capacity:

"We will be expanding our drive capacity. We will have a 3.5" disk drive with a half-megabyte and one megabyte in the future. We have a number of different printers, including a daisy wheel printer.

### On 3 1/2-inch discs:

"No (5 1/4-inch discs, Atari's with) 3 1/2-inch discs. We want to keep all those products alive and build on the software.

### On 8-bit machinery:

"The whole idea as far as the eight-bit line is concerned is to keep that product alive and expand it. As far as beginners, as far as education, as far as people who don't have much money, the eight-bit line is a fantastic produce. We will continue producing it and expanding it.

I'm hoping in 1986 or even the end of this year to have a 256K eight-bit machine with a built-in drive.

### On the ideal Atari computer:

"It would not be on the table. My ideal Atari computer of the future is to have a television with a remote keyboard to be your computer.

### On US Market availability of STs:

"The 520ST system (512K RAM, half-megabyte 3.5" disk drive, & high resolution monochrome monitor) will be sold in July retails for \$799.

"The 260ST will be available in October or end of September and we'll have 2 machines...one will be \$395 without the drive and \$495 with the drive.

### And a message for Atari users:

"The message I have for them is a very simple one. I appreciate all the patience they have had over the years. Now we are here, we are producing the best products and I hope they will be as proud of us as we are of them."

## Monkey business By Michael Fletcher

After conquering the original Donkey Kong we now turn to meet Donkey Kong Jnr.

It's a role reversal from Donkey Kong, because in this game our 'hero', Mario, has to hold Donkey Kong captive at the top of the screen while Jnr tries to set his dad free.

Mario unleashes snap-dragons and birds that drop lethal eggs but perhaps his best aids are the difficult scenarios that you have to climb through to reach father.

There are four scenes: the first scene is a mess of vines and platforms, the second is of chains to unlock, the third a moving tangle of platforms and vines and birds, and the fourth. . . I haven't got through to this final level (yet).

If you are successful in climbing the vines, while avoiding the snap dragons, you will reach the top of the screen where Mario is holding Donkey Kong — but before you can pull the chain that will release Papa Kong, Mario pushes the cage to the next level.

The graphics for Donkey Kong Jnr are very close to the arcade version.

After repetitive plays this game remains interesting, but I can see it becoming tedious, as Donkey Kong did.

That's a fault of all multi level games: after you have mastered them they are stuck at the back of your software collection and are never played again.

Donkey Kong Jnr is a 16K cartridge, manufactured by Atari, and costing \$69.95.

## Jack for NZ?

I talked to Jack Tramiel briefly at the PCW Show, to invite him to be keynote speaker at the Microcomputer Industry Dinner to be held again in conjunction with the PC 86 exhibition in Auckland in May next year (Adam Osborne was keynote speaker at this year's inaugural dinner and exhibition).

He seemed genuinely delighted at the invitation and promised to make every effort to attend.

## LOOKING FOR? SENSATIONAL SOFTWARE MODEMS SPEECH SYNTHESISERS LIGHT PENS DISK DRIVES PRINTERS

NOW AVAILABLE  
AT GREAT PRICES FROM  
SOFTWARE SUPPLIES INC.

### LATEST SOFTWARE RELEASES US GOLD, TASMAN, GILSOFT, HI-SOFT

|                                    |                 |
|------------------------------------|-----------------|
| Super Zaxxon C64, Atari            | \$39.95         |
| Blue Max 2001 C64, Atari           | \$39.95         |
| Raid Moscow Amstrad, Spectrum, C64 | \$39.95         |
| Beach-Head Electron, Spectrum      | \$38.00         |
| Bounty Bob Spectrum, Atari         | \$36.00         |
| Hi-Soft C Amstrad, Spectrum        | \$140.00        |
| The QUILL Spectrum, C64, Amstrad   | \$50.00-\$62.00 |
| The Illustrator Spectrum, Amstrad  | \$50.00-\$62.00 |
| Tasword 464D Spectrum, Amstrad     | \$84.95         |
| EASI-GST Amstrad                   | \$120.00        |

### PLUS 100 s More for:

AMSTRAD, SPECTRUM, BBC, QL, ATARI,  
ELECTRON, C16, C64 Owners.

### MODEMS

|                         |  |
|-------------------------|--|
| PRISM VTX 500 SPECTRUM  |  |
| SKYCOM AMSTRAD          |  |
| MODEM 1000 COMMODORE    |  |
| MODEM 2000 BBC, APRICOT |  |
| MODEM ATARI             |  |

### PERIPHERALS

|                    |                                    |
|--------------------|------------------------------------|
| LIGHT PEN          | SPECTRUM,<br>AMSTRAD               |
| SPEECH SYNTHESISER | AMSTRAD,<br>COMMODORE,<br>SPECTRUM |
| PRINTER I/FACES    | SPECTRUM,<br>AMSTRAD               |
| DISK INTERFACES    | SPECTRUM                           |
| KEYBOARDS          | SPECTRUM                           |

FULL CATALOGUE AVAILABLE BY  
SENDING S.A.E. TO:

**SOFTWARE SUPPLIES (NZ),  
P.O. Box 865, Christchurch**

**ATTENTION DEALERS  
ARE YOU GETTING —  
GOOD SERVICE,  
THE BEST PRICES,  
HIGH MARGINS FOR  
YOUR SOFTWARE AND  
PERIPHERALS. TRY US  
NOW. FULL CATALOGUE  
AVAILABLE TRADE AND  
RETAIL.**

### Getting the Most from your Sinclair Spectrum

By Anne Sparrowhawke.

This appeals to older (say parents) rather than younger people.

At first glance its style may be off-putting because it's wordy.

But here lies its strength. The text gives a blow by blow account, as if you had a personal tutor beside you.

The first five chapters are about BASIC programming for the novice, then follows a chapter on machine level workings, and the use of colour, graphics and sound is explained.

Hardware add-ons are covered as are the types of software available.

A chapter on troubleshooting is more useful than the ZX manual's cryptic comments.

Similarly newcomers find little help from the ZX manual in getting to grips with BASIC. Hence the need for a really helpful book, and after reading this the subtleties of the manuals will be more apparent and appreciated.

J.F. Lamb

### Apple Basic for Business

Alan J. Parker/ John F. Stewart  
Reston \$39.90

Although it contains a rather strange

mixture of topics which range from the impact of computers on society to the use of Visicalc, this book succeeds well in introducing elementary data-processing skills to the Applesoft programmer.

Sequential and random access file-handling is clearly explained as a suite of simple business programs is developed and refined.

It is quite possible to write powerful business programs in Applesoft and this book provides an excellent launching pad for more sophisticated programming ventures.

— Mike Wall

### Better programming for your Commodore 64

By Henry Mullish and Dov Kruger.  
Fontana \$17.95 269 pages.  
Reviewed by W.F. Engel

The authors are computer scientists, which explains the tutorial style.

They give exercises to explain arithmetic operations, then go over to mathematical expressions of algebra in computerese. The chapters each conclude with numbered questions and projects and a little program to write

There are clear explanations of string manipulation, variables, how left, middle and right functions work, and at last I can understand structured programming.

For handling large masses of data is instruction on dimensioning arrays - working with loops and nesting loops, and the conversion of ASCII characters and numbers.

The book deals with sound in an elementary way.

The final chapter gives pointers on debugging and hidden basic commands.

W.F. Engel

### A Dictionary of Computer Terms

By Laura Darcy and Louise Boston.  
Fontana, \$12.95, 282 pages.

With some trepidation I selected this book to review. Being a novice user, I imagined the book would help elucidate the complex labyrinth of computer manual jargon, and I wasn't surprised to discover one could browse easily through this, and not assimilate anything.

The challenge is to manipulate the dry logic of its contents. To this end it does offer a pleasant page layout, easy to read with each reference word in bold type and the explanations slightly indented, in non-squint type.

K.T. Jeltsen

## PITMAN NEW ZEALAND

# SAMS

### THE BEST BOOK OF: FRAMEWORK



This introductory book shows you how to use Ashton-Tate's *Framework* software to its fullest potential. Covers word processing, spreadsheets, data base management, programming, and graphics. Advanced users can learn how to create automatic or custom operations that might otherwise require significant time at the keyboard. For anyone who writes, works with numbers, or needs rapid access to store information. Allan Simpson.

\$45.00

### BEST BOOK OF: SYMPHONY®



*Symphony* is a complete set of integrated application programs and therefore can be overwhelming to the first-time user. This book takes a feature-by-feature approach to explaining and demonstrating the full capabilities of the package. Alan Simpson. 256 pages

\$59.95

### BEST BOOK OF: dBASE II/III



*dBase II®* and *dBase III®* have long been recognized as comprehensive data base management packages. But, they have also gained a reputation for being difficult to use. This book simplifies a very complicated product and allows you to get greater utility from this software. Ken Knecht. \$49.95

PITMAN PUBLISHING NEW ZEALAND  
PO BOX 38-688  
PETONE

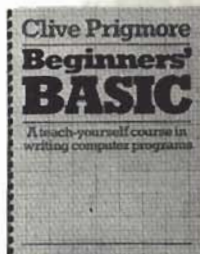
# The BITS & BYTES Computer Book Club

## Our new selection

### Kids and the Apple Edward H. Carlson

Written for 10-14 year-olds but suitable for anyone interested in BASIC programming. Everything explained in non-technical terms, with many illustrations and examples, and notes before each lesson. Covers error messages, debugging techniques, programming shortcuts, saving originals to disk.

Compute Our price \$35.60. Save \$2.90



### Beginners' BASIC Clive Prigmore

Teach-yourself step-by-step guide to programming which can be used with the ZX81, Spectrum, QL, VIC-20, Commodore 64, Oric 1, Dragon 32 and 64, Apple IIe, TRS-80, BBC, Electron, Lynx, TI 99/4A, and Atari 400, 600XL and 800. Contains many worked examples and exercises, and can be used without a computer.

Winward Our price \$39.95. Save \$3.20

### Microcomputers in Real Estate: The New Sales Advantage James E.A. Lumley

Down-to-earth, readable explanation of what a computer can do for a business. Working salesman reviews search, mortgage analysis, accounting, sales management, property management, investment analysis and word processing. Plus plenty of tips on when and how to computerise.

Prentice-Hall Our price \$45.75. Save \$3.70

### BEGINNERS' BASIC



### Beginners' BASIC Peter Lear

Superbly presented introduction to BASIC. Covers the essential material and lets you have plenty of fun in the process. Brilliant illustration and layout make it extremely readable and easy to follow.

Wingard-Hayes Our price \$7.95. Save 70 cents

### The Second Book of Machine Language Richard Mansfield

Written for programming with Commodore 74, VIC 20,

Atari, Apple and PET/CBM computers, this book contains the powerful LADS machine language assembler. As well as being a sophisticated program, the book is a tutorial on how large, complex machine language programs can be constructed out of manageable subprograms. Extensive documentation provided.

Compute Our price \$36.95. Save \$3.00

### Pascal: A Considerate Approach David Price

Clear explanations of programming techniques, combined with many short, sample programs. Emphasis is on considerate programming, and approach to writing programs which are easy to read and modify. More problems and exercises in this revised edition. Covers data types, input and output, functions and procedures, testing and debugging, file handling.

Prentice-Hall Our price \$37.15. Save \$3.35

### Commodore 64 Logo Primer Gary G. Bitter & Nancy Ralph Watson

Divided into three distinct sections — a gradual development of Logo with no other prerequisites except access to a Commodore computer with Commodore Logo; Quick-Start Logo for the person who has some familiarity with the language; and a broad overview of Logo, including its historical development along with useful applications. Together, they give comprehensive cover useful for both the advanced and novice user.

Reston Our price \$37.35. Save \$3.00

### Design of User-Friendly Programs for Small Computers Henry Simpson

Systematic approach to designing developing user-friendly programs that are easy to learn, easy to use and unlikely to cause operator errors. Practical, proven guidelines and principles. Tells how to display information, test operator inputs and provide methods of "friendly" program control. Also looks at selecting hardware, writing using documentation and help screens, testing and debugging programs, and influencing users to accept them.

Osborne/McGraw-Hill Our price \$48.80. Save \$3.95

### Commodore 64 Computer Graphics Toolbox Russell L. Schnapp & Irvin G. Stafford

Shows how to create cartoon characters, maps, calendars, geometrical forms, game boards and game pieces on the C64. Series of working programs charts your progress and a turtle graphics program and two editors provide the tools for drawing pictures and demonstrating the features of advanced graphics systems. Assumes no special mathematical or programming background, and you learn by doing.

Prentice-Hall Our price \$32.90. Save \$2.70

## The club: how it works and what you get.

All you have to do to join the club is buy a book. Just pick out the books you want, fill in the coupon in the middle of the magazine, and post it in FREEPOST.

We offer savings on the cash price you pay for each book.

Please allow three to four weeks for orders to be processed and the book distributors to get the books to you.

## Sinclair

### The Sinclair QL Companion Boris Allan

Covers Sinclair SuperBASIC, principles of structured programming, use of sound and graphics, and hardware facilities. For machine code programmes, there are sections on programming the QL's Motorola 68008 microprocessor and an overview of the Intel 8049 support chip used to handle peripheral devices such as the keyboard. Intended for comparison between techniques for programming the QL and other popular models.

Pitman Our price \$18.14. Save \$1.05

### Using Graphics on the Sinclair QL

Garry Marshall

Introduces beginners and experienced programmers to ways of creating graphics, presents graphics programs and explains how they work. Covers creation of business graphics with QL Easel and writing programs in SuperBASIC for games, simulations and general presentations of information.

Hutchinson Our price \$27.75. Save \$2.20

### Database Management of the Sinclair QL

Mike O'Reilly

Introduction to Archive, the database management program provided with the QL. Explains basic concepts and technology, and guides beginners through all stages to create and maintain database. Emphasis on practical applications with particular stress on design of user-friendly systems.

Hutchinson Our price \$27.75. Save \$2.20

### Machine Code Programming in the Sinclair QL Martin Gandoff

Offers an insight into machine code instructions which activate the Motorola 68008. Shows how to write programs and subroutines using QDOS and how, through knowledge of QL machine code and how to make QDOS save program writing time, you can improve existing programs and fully use the QL's processing power.

Hutchinson Our price \$27.75. Save \$2.20

### Making the Most of the Sinclair QL: SuperBASIC & its Applications

Dick Meadows

Practical guide to programming for the newcomer and experienced user. More than 100 programs for direct use and modification. Reviews essential QL commands and SuperBASIC constructs used for writing programs. Practical programs then cover wide variety of topics.

Hutchinson Our price \$27.75. Save \$2.20

### BASIC Basics for the Timex Sinclair 1500/1000 Michael P. & Simon J. Barnett

Family introduction to BASIC filled with information for managing household finances, using the machine as an electronic message board, as a calculator to solve complicated mathematical functions and many other applications.

Reston Our price \$21.95. Save \$1.75

# Buy now!

## IBM

### IBM PC Programming

**Richard Heskell & Glenn A. Jackson**

Hands-on step-by-step approach for beginners and advanced programmers. Uses actual photographs taken from the computer screen in graphic examples to develop many fundamental programming concepts. Includes information on string variables and functions, IBM PC DOS: numerical variables and arithmetic; expressions; sound effects; medium resolution graphics; loops and subroutines; bar graphs; animated graphics.  
Prentice-Hall **Our price \$27.10. Save \$2.20**

### The IBM Connection

**James W. Coffron**

From the author of the popular Apple Connection, VIC-20 Connection and Z80 Applications, this book shows how easy it is to use your computer with common household devices. Explains techniques for setting up your IBM to control a home security system, home temperature and control system, voice synthesizer to make your computer talk, as well as other home appliances.  
Sybex **Our price \$55.45. Save \$4.50**

### Data File Programming on your IBM PC

**Alan Simpson**

Presents the techniques for writing BASIC programs for mailing list systems, grade books, library referencing system, graphic displays. Covers adding files, searching, sorting, editing and printing formatted reports.  
Sybex **Our price \$55.45. Save \$4.50**

### Your IBM Made Easy

**Jonathan Sachs**

Covers the fundamentals and details major features of the system, including coverage of DOS 2.0 and the PC XT. Step-by-step operating instructions, and a guide to resources — what you need to know about dealers, software, services and accessories. Reference guide to operations and troubleshooting for common problems.  
Osborne/McGraw-Hill **Our price \$29.55. Save \$2.40**

### Science & Engineering Programs for the IBM PC

**Cass Lewart**

Presents 19 programs designed to make optimum use of scientific and engineering applications. Thorough documentation, sample runs, formulae, illustrations and listings. Includes programs for plotting and interpretation, numerical function evaluation, modulation schemes, system reliability evaluation, base-to-base conversion. All programs in IBM PC BASIC and compatible with BASIC versions of 1.10 and 2.0.  
Prentice-Hall **Our price \$28.85. Save \$2.30**

### Computer Graphics for the IBM Personal Computer

**Donald Hearn & M. Pauline Baker**

Discusses basic concepts and techniques of graphics and explores IBM PC's capabilities for these applications. Examines methods for creating two and three-dimensional pictures and graphs, and shows how to manipulate and animate displays. Also analyses make-up of PC and its graphic features.  
Prentice-Hall **Our price \$41.70. Save \$3.40**

### Your IBM PC Made Easy (includes IBM PC (DOS 2.0) and PC XT)

**Jonathan Sachs**

Covers the fundamentals and details the major features. Step-by-step operating instructions and a guide to resources telling you what you need to know about dealers, hardware, software, services and accessories. There's also a reference guide for operations and troubleshooting common problems.  
McGraw-Hill **Our price \$29.55. Save \$2.40**

### Animation, Games and Sound for the IBM PC

**Tony Fabbri**

Learn by having fun through brief discussions and programs at first, and ready-to-use examples to help you create new games and practical explanations. You learn programming skills in the process.  
Prentice-Hall **Our price \$54.10. Save \$4.40**

### Easy Writer for the IBM Personal Computer

**Don Cassel**

Designed to help you learn Easy Writer and evaluate its capabilities before buying. Your system needs 64K RAM, a single floppy disk drive, a monochrome 80-column monitor and a printer.  
Prentice-Hall **Our price \$35.95. Save \$2.90**

### Software Construction Set for the IBM PC & PC Jr

**Eric Anderson**

Complete package of software tools to help in designing programs. Contains techniques, advice and individual routines to help you build custom-made programs. References for information storage and retrieval, data searches, sorts, window building, using disk files, display charts and graphs.  
Hayden **Our price \$51.75. Save \$4.20**

### WordStar on the IBM PC

**Richard Curtis**

Complete guidebook written in clearly understood style. Assumes no prior knowledge of WordStar or the IBM-PC. Includes all enhancements the IBM-PC brings to WordStar along with add-ons such as MailMerge, SpellStar, StarIndex and CorrectStar.  
McGraw-Hill **Our price \$30.50. Save \$2.45**

### Handbook for Your IBM PC (includes XT version)

**Louis E. Frenzel & Louis E. Frenzel, Jr.**

Experienced users will find it a handy reference, with a concise summary of key operational information and as a source book of information about non-IBM accessories. Beginners will find it step-by-step guide to using the computer and a source for "what to do and how to do it".  
Sams **Our price \$35.15. Save \$2.85**

### Software Solutions for the IBM PC: A Practical Guide to dBASE II, Lotus 1-2-3, VisiCalc, Wordstar & More

**Thomas H. Willmott**

Sets out to answer the question: what can a microcomputer software system do for my business?... and how do I get started? Conversational style explains how to streamline office procedures and solve business problems using leading software programs. Also converts fundamentals of PC DOS IBM hardware components, BASIC language and the strengths and limitations of canned software products. Exercises and sample programs throughout.  
Prentice-Hall **Our price \$32.95. Save \$2.65**

### Science Computer Programs for Kids & Other People (Apple II version)

**Tom Speitel, Mike Rook, Khan Pannell, Cornelia Anquay & Danny Speitel**

Introduction to scientific concepts through graphics-orientated BASIC programs. Original, fun representation covering topics such as elementary electronics, physics, biology, weather and astronomy, and space. Each program is interactive, educational and easy to understand.  
Prentice-Hall **Our price \$21.20. Save \$1.70**

### Here Come the Clones: The Complete Guide to IBM PC Compatible Computers.

**Melody Newrock**

Explains which compatibles run what and which are hardware compatible, where the differences in design are critical, how the clones compare in overall performance, why some are and some are not real bargains, and where their hidden costs lie.  
Osborne/McGraw-Hill **Our price \$48.95. Save \$4.00**

## Atari

### Assembly Language Programming for the Atari Computers

**Mark Chasin**

Routines follow the rules established for assembly language programmers and will work with any Atari computer. Examples given in both assembly language and, where possible, BASIC incorporating assembly language routines to perform tasks in BASIC.  
Osborne/McGraw-Hill **Our price \$41.60. Save \$3.35**

### How to Excel on Your Atari 600XL & 800XL

**Timothy O. Knight**

Chapters on programming, graphics, sound and music in straightforward terms. All key terms defined, and many accompanied by illustrations. Suggests many uses for business and fun.  
Osborne/McGraw-Hill **Our price \$25.85. Save \$1.90**

## BBC

### Handbook for Procedures & Functions for the BBC Micro

**Audrey & Owen Bishop**

Variety of procedures and functions that can be used with programs of all types. Description of what each does, followed by a listing and explanation of how it works. Example of a calling program showing how to incorporate each procedure or function into your programs.  
Granada **Our price \$25.90. Save \$2.05**

### Exploring Music With the BBC Micro & Electron

**Kevin Jones**

Explores creative ways of using the computers to make music. Shows how to generate sounds, and to combine sound characteristics and rhythms. Covers wide range of styles — pop, folk, classical and modern. Examines many musical ideas and techniques.  
Pitman **Our price \$36.00. Save \$2.95**

### Getting the Most From Your BBC Micro

**Clive Williamson**

Introduction intended to complement the User Guide supplied with the machine. Contains many hints and tips on programming and general use. Explores many possible uses and the computer's potential for expansion to suit individual needs. Some features and accessories, undocumented in the User Guide, are investigated, with specific advice on connecting printers, TV monitors and disk drives.  
Penguin **Our price \$13.80. Save \$1.15**

### BBC Micro: Music Masterclass

**Ian Ritchie**

Professional musician starts with the essentials of programming sound and music, harnesses bytes and beat to show the way to the harmony of clefs and chips of electronic music. BBC can be a drum machine or synthesiser, instrument or interface, component or composer. Introduces music notation and theory of chords and harmony.  
Pan **Our price \$27.70. Save \$2.25**

### 21 Games for the Acorn BBC Micro

**Mike James, S.M. Gee and Kay Ewbank**

Collection of games programs specifically written to exploit the BBC's sound, colour and graphics capabilities, and learn BASIC programming skills as you go. Each game comes with an explanation of how its program works, along with tips on how to modify or personalise it to create variations.  
Prentice-Hall **Our price \$37.15. Save \$3.00**

### The BBC Micro Gamemaster

**Kay Ewbank, Mike James & S.M. Gee**

Shows you how to develop your own games as you learn the techniques of the professional games programmers. You also pick up the skill of solving programming problems as they arise. Programs are structured so that each procedure, or module, performs a distinct task allowing variations on the "core" program to be written by substituting new modules. Also advice on how to customise your programs.  
Granada **Our price \$20.30. Save \$1.65**

### Cracking the Code of the BBC Micro

**Benni Notarianni**

Practical guide to machine code programming introduces you to the 6502 hardware and instruction set, then teaches you to combine the separate elements of machine code into the fast code of commercial programs. You learn creation, manipulation and the animation techniques for arcade graphics, there is a set of arithmetic routines for calculation within machine code programs, and appendices on the instruction set, BASIC 1 differences and fixes, and OSWORD calls.  
Pan **Our price \$24.95. Save \$2.00**

### Games for the Acorn BBC Micro

**Mike James, S.M. Gee and Kay Ewbank**

Collection of games programs specifically written to exploit the BBC's sound colour and graphics capabilities, and learn BASIC programming skills as you go. Each game comes with an explanation of how its program works, along with tips on how to modify or personalise it to create variations.  
Prentice-Hall **Our price \$37.15. Save \$3.00**

## Software

### The Complete Guide to Software Testing

**William Hetzel**

Explains how software can be tested and how testing should be managed within a project or organisation. Aimed mainly at the software practitioner, it covers concepts of testing, testing techniques, methodologies, and management perspectives. Each chapter contains examples and checklists to help the reader understand and adapt material to personal needs. Case studies based on the author's experience.  
Collins **Our price \$65.60. Save \$5.35**

### Whole Earth Software Catalog

**Stewart Brand**

A comparative guide and recommendations on software, hardware, magazines, books, and accessories, suppliers and online services for personal computers. Lots of tips on buying and shopping around, and warnings on what to beware of.  
Corgi **Our price \$27.70. Save \$2.25**

### pfs Software Made Easy

**Carl Townsend**

Step-by-step tutorial to the pfs series — pfs Write, pfs File, pfs Report, pfs Access and pfs Graph. Programs will work on the IBM PC and XT, Apple IIe IIc and III, and the TI Professional — and you will need at least one disk drive, preferably two, or a hard disk system. Book includes tips for integrating programs and working with advanced applications.  
Osborne/McGraw-Hill **Our price \$41.60. Save \$3.35**



## Business

### Multiplan Home & Office Companion

Elna Tymes & Peter Antoniak

Collection of models covering a broad Spectrum of business and personal applications, personal finance, household management Ready-to-use model described and accompanied by the listing needed to create the model and sample data with your own. As you become familiar with Multiplan, the modelling techniques help you to create customised models.

Osborne/McGraw-Hill Our price \$36.95. Save \$3.00

### Lotus 1-2-3 Simplified

David Bolcan

Designed for all levels, it starts with installing and using Lotus 1-2-3, then moves through designing and using spreadsheets; formatting spreadsheets and making them aesthetically pleasing; generating printouts; working with oversized spreadsheets; graphics functions, data management; advanced spreadsheet applications and programming with macros. Attractive presentation includes many diagrams and graphs.

TAB: Our price \$31.70. Save \$2.55

### Guide to using Lotus 1-2-3

Edward M. Baras

Detailed comprehensive guide to help you make full sense of Lotus 1-2-3's integration of spreadsheet, database and graphic functions. Includes step-by-step instruction on implementing practical application models for financial forecasting consolidating business statements, simulating dynamic processes, electronic forms management. Equally useful to beginners and experienced users.

Osborne/McGraw-Hill Our price \$38.80. Save \$3.15

### Business Program Portfolio for your Apple IIe: An Integrated Office System

George H. Hildebrand

Collection of 61 BASIC programs covering such office tasks as interest calculation, financial analysis, depreciation, property management and real estate, cash receipts and disbursements, job cost, payroll. All programs documented for implementation and modification. There is also a guide to printing out business forms, creating a menu system, and securing business records with password programs.

Hayden Our price \$51.75. Save \$4.20

### On-Line Computing for Small Businesses - Silver's Wall

Maurice A. Silver,

John Jeacocke & Ray Welland

Sets out to provide managers of small businesses with a clear, concise but non-technical instruction in the use of on-line computing based on the practical experience of the authors. No prior knowledge of computing assumed and only essential technical definitions are included.

Pitman Our price \$9.70. Save 70 cents

### The ABCs of 1-2-3

Chris Gilbert & Laurie Williams

Hands-on approach using detailed step-by-step instructions. Lessons involve tackling projects such as building a worksheet, displaying the worksheet as a graph, building a database, simplifying several operations using macros, performing calculations and printing graphs and reports. Remains a handy reference once you are familiar with 1-2-3.

Sybox Our price \$37.85. Save \$3.05

### Taking care of Business with your Commodore 64

David P. Dautenhahn

More than 100 brief BASIC and financial programs, each documented with a short explanation of what the computer will do and a BASIC listing. A real-life scenario follows, with a sample run and more instructions on how to combine two or more applications. Programs include: interest, depreciation, retailing, real estate, loan analysis, savings, lease analysis, time value for money, stocks and bonds analysis, sinking fund analysis, forecasting inventory needs, payroll, insurance, metric conversion.

Hayden Our price \$35.60. Save \$2.90

### 1-2-3 Run: 41 ready-to-use Lotus 1-2-3 Models

Robert & Lauren Flast

Collection of models that run on Lotus 1-2-3. Each model presented with a step-by-step description, complete listing, an illustration with sample data (you simply replace this with your own), and where applicable, instructions to produce bar and line charts. Designed to simply work, the models include applications for sales, accounting, real estate and the classroom.

Osborne/McGraw-Hill Our price \$38.80. Save \$3.15

### Database for Fun and Profit

Nigel Freestone

For users wanting to do their own programming. Provides straight forward introduction to data processing, with explanations of routines in BASIC. Examples of system designs for home and business, which can combine and

expand. Systems for names and addresses, catalogue index; diary; stock control; bank account/budgeting; debtors list/sale/purchase ledger; payroll.

Granada Our price \$18.45. Save \$1.50

## Electron

### Getting the Most From Your Acorn Electron

Clive Williamson

Comprehensive introduction to the Electron, exploring its potential and possibilities to suit each owner's needs. Intended to complement the user guide, and contains many tips on programming, software and the general use of the computer. Some features and accessories not documented in the user guide are investigated.

Penguin Our price \$14.75. Save \$1.20

### The Electron Gamemaster

Kay Ewbank, Mike James & S.M. Gee

Programs structured so that each procedure, or module, performs a distinct task, allowing variations on the "core" program to be substituted. You also learn how to customise your own programs, improving your programming skills along the way.

Granada Our price \$20.30. Save \$1.65

### Adventure Games for the Electron

A.J. Bradbury

Numerous examples and ready-to-run program modules in a book which lets you in on the secrets of professional games programming. Takes you through the whole process of writing an adventure, with a chapter on the type of instructions you are most likely to need. All programs in MODE 6 unless otherwise stated.

Granada Our price \$25.85. Save \$2.10

## Apple

### Getting Started With ProDots

B.M. Peake & D. Rorke

Aimed at Apple II and IIe users, this is needed for someone familiar with the existing Apple DOS 3.3 systems. Comprehensive guide to ProDots, with exercises for practice. Reference section goes over commands and comments on their use, and there is a discussion on the advantages and disadvantages of the system. A list for further references is included.

Bluewater Press Our price \$6.45. Save 50 cents

### Applesoft BASIC: A Teach-Yourself Introduction

B.M. Peake

Second edition revised to cover the Apple II Plus and IIe. A manual for New Zealanders to learn BASIC with the Apple, instead of picking information from two or three sources includes model answers. Enquiries for class sets welcome.

McIndoe Our price \$12.90. Save \$1.05

### Fun, Games & Graphics for the Apple II, IIe & IIc.

Paul Garrison

Collection of more than 75 ready-to-run programs which you can use, study, modify, combine and experiment with. Complete listings written in standard Applesoft BASIC and CP M-Supported BASIC-80, and explanations. More than 20 financial and record keeping programs, and a wealth of graphics and education programs, a word processing organ and some small-scale database programs.

TAB Our price \$39.75. Save \$3.20

### Ken Uston's Illustrated Guide to the Apple IIe

No-nonsense illustrations which allow the reader to master any application without reading the whole book. Self defined chapters deal with buying a computer, which Apple IIe components to buy, how to create a database, word process and perform spreadsheet calculations, how to tap into electronic information services, how to do fundamental BASIC programming, video games.

Prentice-Hall Our price \$35.95. Save \$2.95

### Applied Apple Graphics

Pip Forer

Step-by-step introduction to graphics and their applications using BASIC. Suitable for Apple II, IIe and II-Plus. Covers hardware and software enhancements as solutions to graphic problems, in particular, reviewing the software utilities that can make BASIC programming pointless in some cases. Special disk, with 30 programs and 24 other files, is needed to understand many parts of the book.

Prentice-hall Our price \$66.75 (includes disk) Save \$5.40

### The Apple House

John Blankenship

Explains how to compose your Apple to control your house security, lights, heat, telephone etc. This system allows the house to accept verbal commands and respond with its own voice. Shows how to build some items from scratch, and how to use some of the

equipment you already own.

Prentice-Hall Our price \$41.50. Save \$3.35

## Commodore 64

### Cracking the Code on the Commodore 64

John P. Gibbons

Introduction to 6510 instruction set and how to combine the elements of machine code into commercial-style speed. Full machine code monitor with 14 commands gives you the tools to interface with the 64's architecture. Learn good programming practice and trade tricks while using the sprite, sound and hi-res graphics, and get to grips with the interrupt handling for multiple sprites and smooth screen scrolls.

Pan Our price \$24.95. Save \$2.00

### Getting the Most From Your Commodore 64

Simon Potter

Uses diagrams, colour photographs, programs and examples to introduce you to the machine. Moves from starting through writing programs to graphics and sound, printers, disks, and extras and troubleshooting.

Penguin Our price \$12.90. Save \$1.05

### First Steps in Machine Code on Your C64

Ross Symons

Clear concise explanation of machine code - introduction to the disassembler and its use; instructions for the 6510 chip with the aid of a demonstration program; discussion of the kernel operating system and its applications such as printing, input/output devices and scanning the keyboard. Two complete machine code games show you how to create your own high speed, animated arcade-like games.

Corgi Our price \$12.00. Save 95 cents

### Data handling on the Commodore 64 Made easy

James Gatenby

Data processing - sorting raw facts to produce useful information - can be just as rewarding as playing games. Explains how to use the Commodore 64 to process information for the home and small business. Uses straightforward examples to demonstrate storage of large quantities of data, attractive and readable on-screen display, and searching and print-outs.

Granada Our price \$20.30. Save \$1.65

### Commodore 64: Basic Programs in Minutes

Stanley R. Trost

Collection of versatile, ready-to-enter programs for more than 65 home and business tasks on the Commodore 64. Programs for home finances, business calculations, real estate, data analysis record keeping and education. No knowledge of BASIC programming needed to use programs which can be entered and ready to run in less than 10 minutes.

Sybox Our price \$37.30. Save \$3.05

### The Commodore 64 Experience

Mike Dean Klein

The many and varied uses of a home computer - programs for the home (recipes, shopping, phone books, kitchen metrics, budgeting); education programs (maths, geography, spelling, languages, graphics); entertainment programs, business programs (appointments, cash flow, interest, cheque books, inventory); utility programs (sprite creation, character design, memory loader, saver and clear, disk menu aids). All programs can be modified.

Reston Our price \$31.80. Save \$2.60

### The BASIC Explorer for the Commodore 64

Lee Berman & Ken Leonard

Combination of suspense novel and instructional text, it teaches introductory programming in BASIC. Elements of Commodore 64 BASIC and the thought processes that go into designing a computer program to solve a problem are introduced through the adventures of three modern-day explorers.

Osborne/McGraw-Hill Our price \$29.95. Save \$2.40

### Commodore 64 Machine Language Tutorial

Paul Blair

Gets to grips with the intricacies of machine language programming, helping to overcome the demanding exacting and sometimes exasperating requirements. But master it and tasks such as sorting, searching and some graphics become much quicker. Judicious use of machine language also allows you to use larger and more complex programs. Demonstration program provided, with examples of short machine language routines.

Holt-Saunders Our price: Book & disk \$53.20. Save \$4.30 Book & cassette \$50.85. Save \$4.10

## Language/programming

**Structured Programs in BASIC** Peter Bishop  
Opens with a discussion of program structure and design. The rest of the book comprises example programs, with the complete program design process (from initial specification to final listing) carried out. Excellent source of programming techniques, algorithms, program modules, ready-to-run programs and ideas.  
Nelson **Our price \$25.65. Save \$2.10**

**MS-DOS User's Guide**  
Paul Hoffman & Tamara Nicoloff  
Sets out to familiarise you with MS-DOS in all versions — IBM PC-DOS, and Versions 1.0, 1.1, 1.25, 2.0 and 2.11. Covers each computer running MS-DOS, gives the versions it runs and lists any improvements the manufacturer has made to the system. Complete information on software that runs under MS-DOS and products available to enhance the system.  
Osborne/McGraw-Hill **Our Price \$41.61. Save \$3.35**

**The MBASIC Handbook** Walter A. Ettlin & Gregory Solberg  
Concise, graduated tutorial to help you build programming skills for use in business, education and personal applications. Covers MBASIC tools; describes statements, functions, commands and sequential and random access files; debugging and documenting programs. Includes five fully documented business programs which can be customised.  
Osborne/McGraw-Hill **Our price \$40.75. Save \$3.30**

**The Second Book of Machine Language** Richard Mansfield  
Written for programming with Commodore 64, VIC-20, Atari Apple and PET/CBM computers, this book contains the powerful LADS machine language assembler. As well as being a sophisticated program, the book is a tutorial on how large, complex machine language programs can be constructed out of manageable subprograms. Extensive documentation provided.  
Compute **Our price \$36.95. Save \$3.00**

**The CP/M-86 User's Guide** Jonathan Sachs  
Comprehensive guide covering everything from Concurrent DOS CP/M-86 and Concurrent CP/M-86 to MP/M-86. Thorough explanation of commands, menu systems and files, then coverage of more advanced features such as DR Talk, DR EDIX or DR/Net. Advice on troubleshooting, full index and bibliography, and three machine-specific appendices on the IBM PC and XT, DEC Rainbow and CompuPro.  
Osborne/McGraw-Hill **Our price \$41.60. Save \$3.35**

**Adventures With Your Computer** L.Rade & R.D. Nelson  
Easily followed activities include 16 chapters of adventure followed by 16 commentaries, providing solutions and guidance on how to program these solutions in BASIC. Avoids getting machine-specific or getting involved in dialects of BASIC. Programs usually given in a flow-diagram form, using minimal BASIC.  
Penguin **Our price \$9.20. Save 75 cents**

## Games

**Arcade Games for Your VIC-20** Brett Hale  
A 15-year-old whiz kid from Victoria, Australia has put together a collection of 20 arcade games for the unexpanded VIC-20. All programs listed twice — once for a straightforward keyboard play, and once for use with a joystick. All games extensively play tested. Selection includes Galaxy Robbers, Yackman, Sub Attack, Fantasy, Pinball, Indi 2000, Leaper and Bullet Heads.  
Corgi **Our price \$10.10. Save 95 cents**

**More Arcade Games for Your Commodore 64** Brett Hale  
Collection of Arcade games by Australian whizz kid, 15-year-old Brett Hale. Games are in BASIC and can be modified to your wants. And they are listed twice — for keyboard and joystick use. Includes Speedy Boulders, Encircle, Yackman, and Barrell Jumper.  
Corgi **Our price \$10.15. Save 80 cents**

**Arcade Games for Your Commodore** Brett Hale  
Fifteen-year-old Victorian whizz kid, Brett Hale has put together a collection of 12 extensively play-tested arcade games which are in BASIC and can be modified. Each is listed twice — for keyboard and joystick. Includes Tick, City Terror, Bricklayer and Surface Lander.  
Corgi **Our price \$10.15. Save 80 cents**

**Virgin Computer Games Series**  
Edited by Tim Hartnell  
Each book contains a selection of more than 20 games which allow you to hone programming skills as well as have plenty of fun. Contains brief dictionary of computer terms, bibliography and hints on how to improve and extend some of the programs.  
**Commodore 64 edition \$11.05. save 90 cents Spectrum, ZX 81, TRS-80, VIC 20, Oric Dragon, Atari, BBC editions \$8.30. Save 75 cents Atari 600XL edition \$14.75. Save \$1.20**

**Tim Hartnell's Giant Book of Computer Games**  
More than 40 games compatible with Microsoft BASIC able to run on most micros, including BBC, VIC 20, Oric, Apple II and IIE, Commodore 64, Dragon 32, Tandy Color, IBM PC, Laser, TRS-80, PET, M280K and Spectrum. Range covers board, dice, space, brain and adventure games, simulations, artificial intelligence, and most just for fun.  
Collins **Our price \$13.80. Save \$1.15**

**40 Educational Games for the VIC-20** Vince Apps  
Programs designed to help younger family members handle the VIC-20 and increase their general knowledge. Uses variety of games aids such as the beat clock, stop the hangman, race the buzzer. Subjects include geography, languages, mathematics and science. Hints included to show how programs can be changed as skills improve.  
Granada **Our price \$20.30. Save \$1.65**

**Fantastic Games (Commodore 64 & VIC-20 editions)**  
Introduction provides instructions on running the games and the book ends with a section on how games are made. In between are Speedboat, Logger, Haze Maze, Getaway, Sub Attack and Snail's Trails.  
Wingard-Hayes **Our price \$7.95. Save 70 cents**

**Space Adventures (Commodore 64 & VIC-20 editions)**  
Introduction provides instructions on running the games and the book ends with a section on how games are made. In between are Moonshuttle, Meteor Shower, Protector, Alien Attack, Red Alert and Invasion — with a couple of sections explaining data and read statements.  
Wingard-Hayes **Our price \$7.95. Save 70 cents**

**Compute's Second Book of Commodore 64 Games**  
Sixteen new worlds to explore... from photographing the Loch Ness monster to running a presidential campaign... to test your strategy, skill and knowledge. All ready to type in and play. Also articles on writing text adventure games and designing video games, and special-purpose programs to guarantee error-free program entry.  
Compute **Our price \$35.60. Save \$2.90**

**Tim Hartnell's Giant Book of Spectrum Games**  
More than 80 programs covering just about every sort of game imaginable — arcade action, mind benders, chance and skill, adventure, space, board and card, fun, simulations. And there are utility and demonstration programs, games to convert notes on error trapping and a glossary.  
Collins **Our price \$13.85. Save \$1.10**

## Spectrum

**Cracking the Code on the Sinclair ZX Spectrum** John Wilson  
Practical machine code programming guide allowing the user to harness the full power of the Spectrum's hardware and escape the confines of BASIC. You are introduced to Z80 instruction set and learn to combine the various elements of machine code in commercial-like programs. Annotated example programs allow you to enter and use fast screen handling routines and sorts in your own programs, debug them with the trace facility, and run them with the on-screen clock. Covers ROM routines, interrupt handling and programming principals.  
Pan **Our price \$24.95. Save \$2.00**

**Adventures for Your ZX Spectrum** Clive Gifford  
Six ready-to-run adventure games — Crash! Pearl Diver, The Ring of Power, The Seven Keys of Tarkus, School's Out and Everyday Adventure — plus advice on writing your own adventures on a glossary and bibliography.  
Virgin **Our price \$13.85. Save \$1.10**

**An Expert Guide to Spectrum** Mike James  
Practical introduction to the Spectrum's advanced hardware and software features. Aimed at the user seeking a deeper understanding of the machine and its capabilities. Starts with an inside view of the micro, then moves to a connoisseur's guide to ZX BASIC and an introduction to the machine operating system. Covers ZX video tape system, RS232 interface, microdrive and advanced programming techniques. Complete program listings and projects for further exploration.

Granada **Our price \$23.10. Save 1.85**

**The Sinclair User Book of Games and Programs for the Spectrum**  
Sixty games and programs from the Spectrum magazine, Sinclair User; protect your castle from invading soldiers in Siege; test your three dimensional sense Labyrinth; improve your geography in Mapwork, face Mr Spec Trum on Wimbledon's centre court, run your own cricket test at Lords, jump a clear round in Olympia, play nougts and crosses against the computer, sink a submarine in Depth Charge, tackle a crash typing course in Touch Type.  
Penguin **Our price \$12.90. save \$1.05**

**Practical Spectrum Machine Code Programming** Steve Webb  
Designed for programmers who want to write faster and better programs than they can in BASIC. Assumes you have no knowledge of machine code and works through the details to the point where you are linking routines and using routines with BASIC programs. Questions throughout to test progress.  
Virgin **Our price \$18.05. Save \$1.45**

**The Spectrum Add-On Guide** Allan Scott  
Non-technical language used to explain what various peripherals do, how they work and how you can use them in programs... games, programming, business word processing or whatever. Detailed program listings for "best buy" in each section, and a complete adventure game that can use up to seven add-ons, including two network Spectrums.  
Granada **Our price \$20.35. Save \$1.60**

## Spectravideo

**Games For Your Spectravideo** Damon Pillinger & Danny Olesh  
More than 25 programs including Minefield, Road Race, Star Strike, Towers of Doom and High Fighter. Plus a series of graphic demonstrations and a chapter on making effective use of the Spectravideo's sound.  
Virgin **Our price \$12.90. Save \$1.05**

## Keyboarding

**Keyboarding for Information Processing** Robert Hanson  
Enables a person to develop basic touch keyboarding skill in a minimum time. The person who completes the book will be able to key in alphabetic, numeric and symbol information, input numbers on a separate 10-key pad; keyboard information quickly and accurately; understand some of the basic vocabulary used in keyboarding. Can be used for classroom or individual, self-instruction.  
Osborne/McGraw-Hill **Our price \$12.30. Save \$1.00**

**Quick Keyboarding** Vonnie Alexander  
Sub-titled "Component Keyboarding in 6 hours", this book by New Zealander Vonnie Alexander has a unique method for teach-yourself competent keyboarding. A wall chart of finger positions is included.  
Methuen **Our price \$7.35. Save 60 cents**

## General

**Graphics Compendiums — editions for Spectrum & Commodore 64** David Durang  
Useful graphics designs and programs, including large library of pre-defined graphics characters, easy-to-use programs for designing and loading of your own graphics, special sections on graphic effects and animation techniques. Plus a selection of graphics games.  
Pitman **Our price \$18.45. Save \$1.50**

**Computer Bits and Pieces** Geoff Simons  
This compendium of curiosities is an informative, amusing and entertaining — and somewhat disturbing — account of the wide-ranging activities of computers...their uses in science and research, creativity, transport, industry, offices and administration, medicine and health, monitoring the environment, education and training, games and entertainment, the home, and the future.  
Penguin **Our price \$11.95. Save \$1.00**

## The Companion to the Electron

By Jeremiah Jones and Geof Wheelwright, Pan Books, Collins. \$21.95, 285 pages.

This book is thicker than the usual computer texts, with no pretty pictures, relatively few diagrams, but a comprehensive index of about 500 entries.

It is punctuated with 105 demonstration programs, each with an introduction and following commentary, and in some cases line-by-line explanation.

To quote the authors: "We have assessed the strengths and weaknesses of the 'Acorn Electron User Guide' and concentrate on those areas in which the manual fails to provide users with adequate support".

In view of the above, it may be surprising to find 110 pages devoted to BBC Basic Key Words, but this also includes 50 full programs.

For example OPENUP and the subsequent discussion on "file handling on tape" covers 11-pages with an 8-page program showing how it's done.

Each Basic key word entry concludes with the appropriate token number and the final chapter contains a disassembler program making use of the token numbers.

A disappointing omission is a numeric

list of token numbers; so having found the token number the reader will have to hunt through the Basic key words to find the related key word.

A chapter on character generation deals with the binary-hex relationship, simple character creation, characters in motion, mirror characters, inverse characters, and double characters – each supported by a program to demonstrate the effect.

Finally four chapters deal with machine code and assembly language, the assembler, operating system, and a disassembler program.

All the programs appear to be photocopies from a very average computer printer – and they are not nice to read.

Otherwise the programs run without trouble and were instructive.

Unlike the programs, the text is easy to read.

This is a fine instruction manual covering that area of programming between Basic and the "heavy stuff" written for professional programmers.

– Ken Meredith

## Ladybird Computer Series

These four booklets are written by members of the Loughborough Primary

Microproject and cover BBC and Spectrum computers.

The publisher, Ladybird, has co-opted educators and the result is a set of clearly-written books unusually free from the apparently obligatory detail often a part of computer writing.

They are also free of jargon, and do appeal to the younger reader.

They introduce the novice to the computer and several small programs demonstrate sound and graphics functions.

Well presented with cartoons and colour, they attract and hold the interest of younger readers but are useful to all age groups.

– RJ Clement

## Classifieds

**Cat computer for sale.** runs most apple software. Great for home or business. With disk drive and T.V. modulator. \$995 P Famularo, 142 South Rd, Masterton.

**WANTED:** back issues of Dr. Dobbs Journal (virtually any), and early issues of Byte. Please send a list of what you have, and what you'll sell them for, to Gordon Findlay, 87 Somerfield Street, Christchurch, 2.

HIGH QUALITY

# BINDERS!

## for BITS & BYTES

We now have available binders to hold your copies of BITS & BYTES. We have opted for the same type of binder used last year (pictured) as these provide high quality protection in an attractive finish.

These are available in two styles.

STYLE 1: With the words "BITS & BYTES, VOL 3, September 1984–August 1985".

(For those who have a complete volume.)

STYLE 2: With the words "BITS & BYTES" only. (For recent subscribers or those with a mixture of volumes)

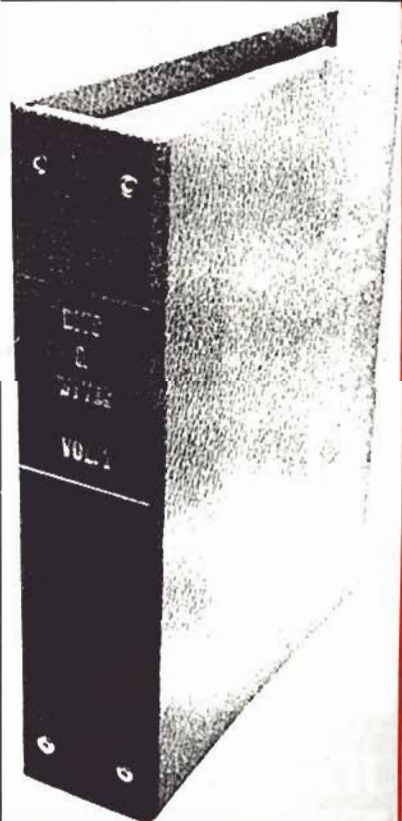
Each Binder holds 11 magazines

**Order now as stocks are limited!!**

**Please use the book club order form in the centre of the magazine and be sure to note which style of wording you require.**

**Cost: \$17.95 per binder**

**\$17.95 EACH**



## Classifieds

**Bank Street Writer (Apple 128K version) for sale.** Original disks and documentation, \$90. Please contact Otairi School, RD 2, Hunterville (or ph 28522 Hunterville).

**Print Shop (Apple) for sale.** Original disks and documentation, \$65. Please contact Otairi School, RD 2, Hunterville (or ph 28522 Hunterville).

**For Sale: Paper Trimmers.** New. Nylon rollers and replaceable blade in a steel track with Perspex base to view cut. Cuts 12in. deep by any width. \$30 post free. Tom Ragg, 123 North St, Feilding, Phone 35104.

**Spectrum owners** for a full-size Print-out of your program listing, send a cassette and \$6.00 to "Listings" 7 Kaitawa St., Haywards via Trentham. Prompt service guaranteed.

**For Sale Franklin Ace 1000 64K** (Apple compatible) 5 1/4 inch floppy disk drive, Amber screen monitor all for \$2000 ono, Ph 58-775 Temuka or write 5 McNeilly, 4RD, Timaru.

**For Sale 48K Spectrum, ZX Printer,** dataset etc. \$300 ono. (or will sell separately), Ph. Nelson (054) 86351 (collect).

**Apple compatible computer for sale** 48K ram + 16K ramard - Total 64K ram 2 disk drives + Controller, Manuals 300/1200 band Modem Autoanswer/Autodial For only \$2050, B/W Monitor \$150 Phone (3) 384-364

**Ik ZX81 Power supply.** Programs in magazines (10), Ideal Xmas gift for beginner \$80!!!  
Write: Robert Oliver, Hanning Road, Clyde.

### DOUBLE SIDE YOUR SS DISKS

with this kit from M.C.P.

Send \$7.95 to:  
15 Wilfrid St,  
Christchurch 4.

### AMSTRAD and SEGA

from

The Home Mail Shop

PO Box 134, 40 Harris Street, Waimate.

Send three 25cent stamps for catalogue.

### APPLE IIe

Extended 80 col. text card  
(80 col. + 64K additional memory)

ONLY  
\$110

Nice print card with card  
for all APPLES

\$150

From: **CHASTRONICS**  
Box 22062  
Christchurch Ph. 65-360

## COMPUTER BOOKS From Reed Methuen

### UNDERSTANDING dBASE 111

**Alan Simpson \$79.95**

Here are useful tips on memo fields, quick lookups, complex sorts, record numbers in reports, customer configuration, and custom screens with dFormat.

### THE SPECTRUM ADVENTURER

**Mike Gerrard \$15.95**

*100% solutions to: Snowball, Twin Kingdom Valley, Urban Upstart and Valhalla.*

Here are all the solutions to every problem you will encounter, written in such a way as not to divulge the other secrets of the game. A complete map is provided for each of the adventures.

### A POCKET HANDBOOK FOR THE COMMODORE 64

**Gerrard & Doyle \$11.95**

This book contains all the vital information you will need when using your 64. Conveniently sized this book is easy to use.

### 33 ADULT COMPUTER GAMES IN BASIC FOR THE IBM PC, APPLE II/IIe & TRS-80

**David Chance \$44.50**

33 exciting action-packed games and puzzles designed especially for adults interests and abilities. Quick thinking and plenty of imagination are needed, along with other willing players.

### WHAT TO DO WHEN YOU GET YOUR HANDS ON A MICROCOMPUTER

**Charles Holtzman \$37.50**

Here's a fun-to-read and informative introduction to computer programming that's suitable for every age group. Written in a lively, easy to follow format, it makes it easy to grasp fundamental programming concepts.

### EXECUTIVE PLANNING WITH BASIC.

**X.T. Bui \$59.95**

This is a collection of interactive, business-oriented programs in Basic. Designed to serve both as a teaching text and as a reference work for professionals in the field this book will aid in better decision making and improved general performance.

## Advertisers

|                          |             |
|--------------------------|-------------|
| Amstgrad/Grandstand      | 2,3,60      |
| AVM                      | 55          |
| AWA                      | 22          |
| Barson Computers         | 64,65       |
| CDL                      | Front cover |
| Chaston Trading          | 76          |
| Commodore Computer       | 56          |
| Commodore Computer       | 58          |
| Compumedia (Maxell)      | 77          |
| Computer Game Rentals    | 46          |
| Computer for people      | 35          |
| Control                  | 18          |
| Cudby & Mead             | 12          |
| Data Stream              | 28          |
| Dick Smith               | 68          |
| EC Gough                 | 8           |
| FBN Software             | 49          |
| Fountain                 | 32,33       |
| Genesis Systems          | 30          |
| Hi Tech Micro            | 80          |
| Home Mail                | 76          |
| IBM                      | 6           |
| Innovative Computers     | 10,42       |
| James Electronics        | 48          |
| J R Moon                 | 76          |
| Kane Agencies            | 27          |
| Kapiti Business Systems  | 51          |
| MCP Applications         | 79          |
| Melco Sales              | 15          |
| Micro Software Hire Club | 59          |
| Micro Style              | 50          |
| Micro Ware               | 31          |
| Mitsui                   | 16          |
| ML Systems               | 43          |
| Monaco/Atari             | 39          |
| Nashua                   | 78          |
| NCR                      | 4           |
| NZ Computer Games        | 54          |
| NZ Post Office           | 37          |
| Office Electronics       | 66          |
| Otakou Software          | 67          |
| Progeni                  | 63          |
| P C Power                | 23          |
| Pitmans                  | 70          |
| Racal Milgo              | 24          |
| Reed Methuen             | 76          |
| Sanyo                    | 52          |
| Silkwood Furniture       | 19          |
| Southmark Electronics    | 26          |
| Software Supplies        | 69          |
| Supatech                 | 34          |
| Tekram                   | 35          |
| University Book Club     | 21          |
| Verbatim                 | 20          |
| Warburton Franki         | 44,45       |
| WhitehallBooks           | 67          |

# When you can't afford mistakes.

There really is a difference in disc pack and diskette brands.

It's in the way they are made.

Because the computer industry cannot afford variation in quality of disc packs and diskettes, Nashua looked for, and found a way to ensure absolute consistency.

Here's how we do it.

Quality Circles.

At Nashua we've found the best way to attain this 'consistency' is to ensure that at each stage of production our disc packs



and diskettes are statistically checked to make sure the quality is 'built-in' every step of the way.

Rather than long production lines, we have 'Quality Circles' – small groups of people whose job it is to make sure that each Nashua disc pack and diskette is right in the first place.

The result is a product with such consistency that it is chosen by those people who can't afford mistakes.  
NASHUA DISKS LTD  
3, Osterley Way  
Manukau City  
278 4299

Christchurch/Dunedin  
Whitcoulls Ltd.



There really is a difference.



Maxell of Japan.

The 3½" microdisk  
that gives Macintosh™  
more to chew on  
and helps the  
HP® Touchscreen PC  
tap your deepest  
memories.

Whether you're in search of primeval wisdom, or polishing up financial projections, Maxell makes a microdisk that sets new standards of excellence. In fact there's a Maxell disk for virtually every computer made. Maxell floppys are industry leaders in error-free performance.

Each comes with a 10 year guarantee. And each microdisk is perfectly compatible with your 3½" drive.

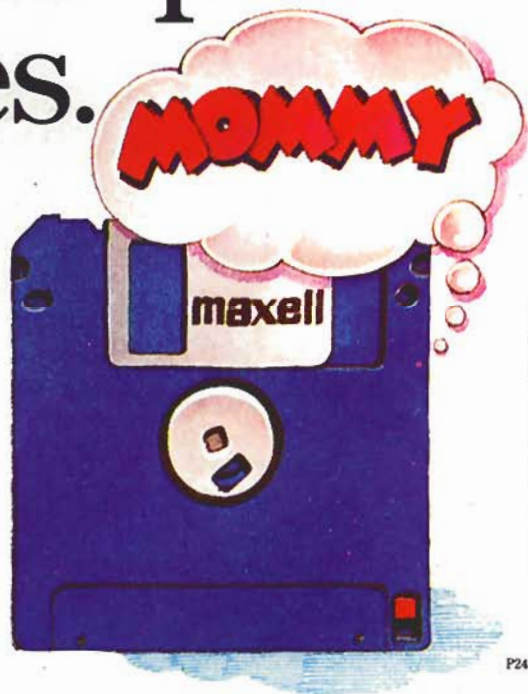
**maxell.**

A NEW STANDARD OF EXCELLENCE

From your computer dealer or contact

**COMPUMEDIA SYSTEMS LTD**

Auckland: P.O. Box 3273, Tel. (09) 444-6085. Tlx 60835  
Wellington: P.O. Box 11091, Tel. (04) 851-548. Tlx 31415



Macintosh is a trademark licensed to Apple Computer Inc.

P2439A

# Compatible Kaypro. So easy to get along with.



## KAYPRO 16

Compatibility. It's half the secret of business success. Getting along with people, getting on with the job. Kaypro 16 gets right into it, using a powerful 16 bit CPU to run the vast IBM software library. Which is more than enough to get on with for most people.

The rugged Kaypro 16 features a 10MB hard disk drive, storing nearly 5000 pages of text, plus a fully compatible 360K floppy disk drive. So you've got a back-up for the hard disk or a way to run

additional software.

The Kaypro 16 also features a detachable keyboard with numeric keypad for easy entry of statistical data.

Kaypro 16 is ready now. Complete with business and personal software packages already on hard disk. All for only \$8749. Getting on with the price is easy too!

## KAYPRO 10

Powerful 8 Bit business computer with 64K RAM running

CP/M. With 10MB hard disk drive and 400K floppy. Priced at \$6395 including free software.

## KAYPRO 2X

Specifications as for Kaypro 10 but using dual 400K floppy disk drives. Priced at \$4560 including free software.

# KAYPRO®

ALL KAYPRO PRODUCTS ARE BACKED BY OUR NATIONWIDE DEALER AND SERVICE NETWORK.

HITEC MICRO LTD  
91 Customs St E  
Auckland  
Phone (09) 399-183

BRIDGEMAN  
COMPUTING LTD  
P O Box 3105  
New Plymouth  
Phone (067) 82-770

COMPUTER  
CONNECTION  
18 Dalton Street  
Napier  
Phone (070) 51-965

COMPUTERS FOR  
PEOPLE  
35 Taranaki Street  
Wellington  
Phone (04) 847-668

KNIGHT SYSTEMS  
LTD  
510 Grey Street  
Hamilton  
Phone (071) 80-666

POWER CORP  
CENTRES LTD  
P O Box 365  
Tauranga  
Phone (075) 81-009

PROFESSIONAL  
ENGINEERING LTD  
P O Box 19  
Rarotonga

ABACUS  
THE MICROSHOP  
Shades Arcade  
P O Box 346  
Christchurch  
Phone (063) 258-662

VAN MELLAERTS  
COMPUTERS  
Box 632  
Palmerston North  
Phone (063) 258-662